The Harvard Medical School–Cambridge Integrated Clerkship: An Innovative Model of Clinical Education
Barbara Ogur, MD, David Hirsh, MD, Edward Krupat, PhD, and David Bor, MD

Abstract

The Harvard Medical School–Cambridge Integrated Clerkship (HMS–CIC) is a redesign of the principal clinical year to foster students’ learning from close and continuous contact with cohorts of patients in the disciplines of internal medicine, neurology, obstetrics–gynecology, pediatrics, and psychiatry. With year-long mentoring, students follow their patients through major venues of care. Surgery and radiology also are taught longitudinally, grounded in the clinical experiences of a cohort of patients and in a brief immersion experience working directly with an attending surgeon. Students participate in weekly, case-based tutorials integrating instruction in the basic sciences with training to address the common and important issues in medicine, as identified by national organizations. In addition, they participate in a social science curriculum that focuses on self-reflection, communication skills, ethics, population sciences, and cultural competence.

In the pilot year (July 2004 to July 2005), HMS–CIC students performed at least as well as traditional students in tests of content knowledge and skills, as measured by National Board of Medical Examiners (NBME) Subject Exams and the fourth-year Objective Structured Clinical Exam, and they scored higher on a year-end comprehensive clinical skills self-assessment examination, suggesting that they retained content knowledge better. From surveys, HMS–CIC students were much more likely to see patients before diagnosis and after discharge and to receive feedback and mentoring from experienced faculty than were their traditionally educated peers. HMS–CIC students expressed more satisfaction with their curriculum and felt better prepared to cope with the professional challenges of patient care, such as being truly caring, involving patients in decision making, and understanding how the social context affects their patients.


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rominent voices are calling for innovative restructuring of clinical medical education.1,2 Because of decreasing lengths of stay and the increasing focus on care in the ambulatory setting, students on inpatient services rarely see patients through whole episodes of illness, from presentation through outcome; thus, students are rarely able to participate actively in the full spectrum of diagnostic reasoning and therapeutic decision making. They fail to see patients with a number of significant conditions that are increasingly managed through outpatient evaluation and treatment. The rapid pace of clinical care marginalizes the teaching of foundational skills such as diagnostic reasoning, communication skills, professionalism, cultural competence, physical examination mastery, and epidemiology. In addition, experienced clinicians, with increasing demands for clinical productivity, have little opportunity for teaching or for developing mentoring relationships with students.3,4

In response to these challenges, a collaborating group of HMS clinicians and educators developed the HMS–Cambridge Integrated Clerkship (HMS–CIC), which is now in its third year. In this article, we present data from the first year that began in July 2004 and ended in July 2005. The main goal of the HMS–CIC was to provide the core clinical education that we believe is essential to the professional development of every medical student, regardless of his or her eventual choice of specialty. The rationale for the educational design was to maximize the learning and retention of fundamental clinical knowledge and skills grounded in a professional perspective and reflective practice.

Description of the Pilot

The HMS–CIC was initiated in July 2004 at the Cambridge Hospital, a 118-bed primary teaching hospital within the Cambridge Health Alliance and affiliated with HMS. Volunteers were sought from the 189 rising third-year Harvard medical students; 18 students volunteered, and eight were randomly selected to take part in the pilot.

Students were paired with preceptors in internal medicine, neurology, obstetrics–gynecology, pediatrics, and psychiatry and were assigned to those preceptors’ ambulatory clinic sites for 5 to 10 hours each week or on alternate weeks (see Chart 1). The faculty members were selected for their commitment to and excellence in teaching, and they served as preceptors for their students for a year. Students thus had a year-long relationship in their ambulatory sites with a team of faculty educators that consisted of an internist, a neurologist, an obstetrician–gynecologist, a pediatrician, and a psychiatrist, in addition to year-long involvement with a teaching radiologist and six weeks with an attending surgeon. In the early months of the core outpatient clinics, assisted by the attending physician in each discipline, students constructed their panels of patients deliberately to reflect a wide range of the major presentations and disease entities as defined by the representative national specialty organizations.
Over the course of the year, students followed these patients to scheduled visits and, whenever possible, to consultations or for acute care, admissions, deliveries, surgical procedures, or rehabilitation visits. This longitudinal follow-up was greatly facilitated by an electronic information program that notified students when their assigned patients registered anywhere in the clinical care system. Students maintained a paper portfolio consisting of all of the notes written at each encounter and a record of the learning topics covered, diagnoses seen, and time spent in each discipline.

Although some of the cohort patients’ illnesses were typical of those found in an ambulatory primary care practice, in general, sicker patients and patients in need of diagnostic evaluation were selected, often allowing students to benefit from both the generalist’s initial approach and consultant’s contributions. Students were able to follow highly specialized cohorts of patients in neurology and psychiatry clinics, providing views of the variations in presentations, responses to treatments, and patients’ experiences over time. To ensure adequate obstetrical experience, students followed at least 10 pregnant patients longitudinally and participated in their prenatal care, deliveries, postnatal care, and, when possible, newborn care.

Several mechanisms were put in place to ensure adequate acute, surgical, gynecologic, and inpatient care experiences. Students took call once a week in the emergency department, where the goal was to have early, ongoing exposure to a patient who was likely to be admitted. Although the majority of these admissions were internal medicine patients, some had acute surgical or neurological problems. Over the course of the year, each student admitted at least 15 acutely ill internal medicine inpatients whom he or she first saw either in the emergency department or the ambulatory care setting. Students followed their inpatients by rounding twice a day, communicating with the house officer team and consultants, and writing daily notes, a discharge summary, and a postdischarge follow-up note. Four mornings a week, dedicated teaching rounds were conducted by the student.

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**Chart 1**

**Sample Weekly Schedule for a Student in the Harvard Medical School–Cambridge Integrated Clerkship, Harvard Medical School, 2004 to 2005**

<table>
<thead>
<tr>
<th>Session and schedule</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00</td>
<td>Pre-round if student has inpatients</td>
<td>Pre-round if student has inpatients</td>
<td>Pre-round if student has inpatients</td>
<td>Pre-round if student has inpatients</td>
<td>Pre-round if student has inpatients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7:45</td>
<td>Inpatient attending physician rounds</td>
<td>Inpatient attending physician rounds</td>
<td>Inpatient attending physician rounds</td>
<td>Inpatient attending physician rounds</td>
<td>Master clinician inpatient rounds</td>
<td></td>
<td>Inpatient rounds if student has inpatients</td>
</tr>
<tr>
<td>8:45</td>
<td>Morning session (9:00-12:30)</td>
<td>Neurology clinic (weekly for ½ year, then alternate weeks)</td>
<td>Obstetrics–gynecology clinic (alternate weeks)</td>
<td>Psychiatry clinic (weekly for ½ year, then alternate weeks)</td>
<td>Pediatrics Clinic</td>
<td>Social sciences curriculum (3 times per month)*</td>
<td></td>
</tr>
<tr>
<td>1:30-5:00</td>
<td>Afternoon session (1:30-5:00)</td>
<td>Self-directed learning</td>
<td>Self-directed learning</td>
<td>Internal medicine clinic</td>
<td>Self-directed learning</td>
<td>Tutorial</td>
<td></td>
</tr>
<tr>
<td>5:30</td>
<td>Post-round if student has inpatients</td>
<td>Post-round if student has inpatients</td>
<td>Post-round if student has inpatients</td>
<td>Post-round if student has inpatients</td>
<td>Post-round if student has inpatients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evening</td>
<td>Evening Department (one night or weekend day per week)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Each student had longitudinal ambulatory clinics in internal medicine, neurology, obstetrics–gynecology, pediatrics, and psychiatry. Inpatient internal medicine, pediatric, and psychiatric patients were admitted from their longitudinal cohorts and from regular sessions in the emergency department. Weekly structured, case-based tutorials and weekly social science rounds supplemented the curriculum.
Inpatient teaching attending or master clinician. In these rounds, students presented and discussed their inpatients at an educationally appropriate level.

In addition to following emergency admissions and longitudinal cohort patients to surgery, students had six weeks of a more intensified surgical experience, during which they decreased their scheduled time in other disciplines and worked directly with attending surgeons in clinics, on rounds, and in the operating room. This enabled them not only to see patients during evaluation, during surgery, during the postoperative period, and after discharge; it also allowed students to witness the real work-life of an attending surgeon.

Attending preceptors in ambulatory clinics in each discipline taught students throughout the course of the year. These attending physicians served as the main preceptors and educators (an alternative to the more traditional inpatient structure in which teaching is done by rotating interns and residents). Although students worked closely with house officers and with the primary admitting attending when patients were admitted, principal inpatient teaching was done by an attending dedicated to student teaching. Additionally, master clinicians—preeminent, experienced physician–educators—met weekly throughout the year with groups of students to work on clinical reasoning and the formulation of complex cases.

In the HMS–CIC, the didactic curriculum (i.e., weekly structured case-based tutorials and social science rounds) and the clinical teaching in each discipline have been constructed on a framework derived from the Accreditation Council for Graduate Medical Education competencies. The HMS–CIC curriculum committee, consisting of representatives from each of the participating disciplines, first adapted these competencies for medical students and then developed a plan to assist students in achieving these skills in a rational developmental sequence. In their clinics and in tutorials, students learned progressively more complex skills and were given more responsibility over the course of the year. Faculty and students found this deliberately developmental structure valuable in focusing the teaching and learning.

Weekly case-based small-group tutorials were a major component of the didactic experiences. Tutorial topics, selected in advance by the multidisciplinary curriculum committee, consisted of diseases and syndromes reflecting many of the most common and important issues in medicine, as identified by national organizations representing each discipline. Each tutorial session was based on actual student cases that best illustrated the topic of the week for the purpose of integrating the relevant basic and clinical science. Tutorials were further augmented by medical simulation exercises to teach skills in diagnosis and treatment, in medical procedures, in teamwork, and in error reduction. In addition, the group had a planned curriculum on professionalism, reflective practice, communication, cultural competence, and population health as these topics related to their actual patients. All didactic sessions were taught by experienced faculty educators in the basic, clinical, and social sciences.

Students learned radiology and pathology through a combination of experiences. They participated in special didactic sessions on principles of radiology and pathology early in the year to provide them with the tools for clinical work, and they had time dedicated as part of many tutorials to review the principles of radiologic and pathologic evaluation pertinent to the weekly tutorial topic. In addition, regular rounds were held with the radiology and pathology teaching attendings to review films and specimens of patients from the student cohorts.

Students were assessed by longitudinal preceptors in each discipline, by tests of content knowledge—the NBME Subject Examinations in Surgery, Pediatrics, Psychiatry, and Obstetrics–Gynecology—by clinical skills evaluations, the Mini-Clinical Evaluation Exercise (Mini-CEX), review of portfolios, observed psychiatric and neurological interviews and case formulations, and by their assigned contributions in tutorial sessions. In accordance with the practice in other HMS internal medicine clerkships, the NBME Internal Medicine Subject Examination was not required. Each student’s team of faculty reviewed the student’s progress informally throughout the year and participated in a midyear assessment retreat. At this retreat, each student’s progress to date and learning needs were documented and discussed. In conjunction with the student’s self-assessment, this formative feedback to students at midyear provided an opportunity to set explicit learning goals and to guide remediation.

**Program Evaluation**

The evaluation plan for the pilot program, approved by both the HMS and Cambridge Health Alliance institutional review boards, was comprehensive and systematic. It consisted of a variety of methods and instruments to evaluate both quantitative and qualitative data. Domains investigated were student attitudes and perceptions, using data derived from midyear and end-of-clerkship questionnaires and focus groups; fund of knowledge and accuracy of self-assessment from NBME Subject Exams and the NBME Comprehensive Clinical Science Self-Assessment (CCSSA); clinical skills and reasoning, from the HMS Objective Structured Clinical Evaluation (OSCE); and clinical experiences, from patient logs. A comparison/control group of 11 HMS third-year students was recruited from students who had not been selected in the random draw for the HMS–CIC, and from other third-year volunteers. The students in the control group rotated through seven core clerkships, moving from hospital to hospital, as is typical for all HMS third-year students. These students were treated just as were those in the rest of their class, receiving no special training or attention, although they did agree to participate in several assessment activities designed for the evaluation of the HMS–CIC. For assessment activities in which all third-year students were required to participate (e.g., NBME Subject Exams, HMS OSCE), it was possible to compare the HMS–CIC and control group students against a larger group consisting of all the remaining members of their class. Because it was not possible to randomly select or to match the HMS–CIC students to the control group students, we checked to see whether these two groups were comparable with one another and with the rest of their class on several available measures. The mean MCAT and USMLE Step 1 scores of the two groups were virtually identical, and the two groups did not differ significantly on their second-year OSCE scores, in their plans for future practice, or in their attitudes.
A second goal was to ensure that students were principally taught by faculty rather than house officers. Responses to the end-of-year survey indicated that HMS–CIC students were observed more by attendings and less by house officers. In addition, compared with the control group, they received almost three times as much of their feedback (88.1% versus 31.5%) and more than twice as much of their mentoring (77.5% versus 37%) from attendings.

A third goal was to ensure that students were exposed to a wide range of those diagnoses selected as core clinical problems. HMS–CIC students’ longitudinal patient cohort sizes ranged from 46 to 115, with significant variation among students in their criteria to enter patients into their longitudinal cohort. Although monitoring patient contacts proved to be quite difficult because of varying levels of student participation, results obtained from monitoring student logs indicate that HMS–CIC students had at least as many contacts with major clinical diagnoses as did traditional students. Both the HMS–CIC students and the control group students were asked to log meaningful patient contacts with 28 core diagnoses. The HMS–CIC students logged equal or more exposure to all of the core diagnoses except shock and congestive heart failure.

Thus, the program was successful in attaining three of its fundamental goals for the education of students: exposure to the entire longitudinal course of illness, teaching by experienced faculty, and exposure to a wide breadth of core clinical problems.

Student outcomes were measured in several ways. In tests of content knowledge and clinical skills, assessed by students’ performance on four NBME subject exams, the NBME CCSSA examination, and the fourth-year HMS OSCE, the HMS–CIC students performed at least as well and, in some cases significantly better, than did the traditional students (see Table 1). Results from the OSCE indicate that HMS–CIC students’ communication skills, compared with those of the students in the control group and the rest of the class, were considerably higher at the end of the year. Also, the HMS–CIC students, as assessed by the end-of-year multidisciplinary CCSSA examination, had improved retention of content knowledge compared with that of the control group (this examination was not given to the students in the remainder of the HMS class).

Clear differences were found between the HMS–CIC and control group students’ responses to surveys about their perceptions of their third-year experience. HMS–CIC students found the year more rewarding and less marginalizing. Importantly, HMS–CIC students felt their year had better prepared them to be truly caring, to deal with ethical dilemmas, to see how the social context affects patients, to respond to patients of diverse backgrounds, and to involve patients in decision making (see Table 2). It has been reported that medical students’ patient-centered attitudes often erode during their third year.12–14 To assess this, all students were given the Tasks of Medicine Scale (TOMS)15 to complete at the beginning of their clinical year and at its end. The TOMS is a questionnaire that asks students to rank order the importance of eight physicians’ tasks, four biomedical (e.g., perform a thorough physical exam; collect data as efficiently as possible) and four psychosocial (e.g., make a human connection with the patient; identify the patient’s goals). At the beginning of the year, the HMS–CIC students ranked psychosocial concerns slightly, but not significantly, higher than did the traditional students. However, by the end of the year, the HMS–CIC students’ scores had increased, and those of the traditional students had decreased, suggesting that ethical erosion did not occur in the students participating in the HMS–CIC.

Faculty perceptions of the clerkship were also positive. Surveys of faculty satisfaction showed that 82.6% of all HMS–CIC faculty involved in teaching found their professional lives more satisfying because of their involvement, whereas only 17.4% found their lives either the same or slightly less satisfying.

Discussion

We had several goals when we developed and piloted the above-described year-long, longitudinal, integrated approach to the principal clinical year. Central to the educational design of the HMS–CIC was creating a continuity of patient care16: the opportunity for students to follow a cohort of patients reflecting a wide range of important clinical diagnoses from each of the core clinical disciplines. This allowed students to develop meaningful connections with patients longitudinally through the evolution of chronic diseases or through acute episodes, beginning with initial presentation, through differential thinking, workup, treatment, and outcome. Students thus witnessed the actual illness scripts that form the basis for clinical reasoning,17 imbuing their learning with the motivation that arises from having a relevant impact on patients’ care, and grounding their professionalism and ethics in the immediacy of real issues.18,19 Continuity of care also permitted students to witness patients’ experiences of illness20 and their interactions with many facets of the health care system.

*Abdominal pain, adolescent physical exam, adult physical exam, anemia, anxiety disorder, appendicitis, asthma, chest pain, confusion, congestive heart failure, COPD, depression, diabetes mellitus, dyspnea, edema, fever, headache, HIV/AIDS, hypertension, jaundice, joint pain, newborn exam, schizophrenia, shock, somatic symptoms, TIA/CVA, abnormal vaginal bleeding, and well child exam.
A second central goal was to provide students continuous, longitudinal relationships with their teams of faculty educators.16 Students were supervised by experienced faculty, providing the time and context to establish a collaborative relationship to facilitate learning over time.21 Each student’s team of educators worked together to provide a richer learning experience and to guide the student’s professional development. In each setting, and as a consequence of their longitudinal contacts with students, faculty educators served as role models and mentors. These supportive relationships allowed for serial, iterative assessment from a variety of perspectives on the full range of student abilities, with attention to remediation. It also provided the possibility of using multiple summative methods within each discipline and across disciplines to assess each student’s abilities.

A third goal was to structure didactic and clinical learning around a developmentally progressive, planned curriculum and assessment, based on integrating national core competencies from all of the major disciplines.16 In each discipline, clinical teaching, didactics, and assessment were structured to promote progressively more complex skills. As students achieved benchmarks within and across disciplines, faculty assisted them to assume progressively more responsibility in their direct patient care. Students and faculty participated in explicit training to foster the developmental nature and continuity of the curriculum. The year-long didactic curriculum consisting of weekly tutorials and social science rounds also progressed developmentally, beginning with an emphasis on problem formulation early in the year, then progressing to therapeutics at the end. All tutorials were organized around key tasks of clinical care, similar to the model of task-based learning developed at the University of Dundee School of Medicine.22 Actual student cases representative of the topic served as the focus for the discussion.

The application of this planned curriculum over one year allowed for the explicit focus on the cross-disciplinary core competencies of history taking, physical examination, clinical reasoning, and the formulation and investigation of clinical questions relevant to the patient’s care.3,4 The planned didactic curriculum also ensured coverage of cross-disciplinary topics as well as topics central to each discipline and provided the structure for a deliberate integration of the basic and social sciences with clinical medicine.

The program explicitly sought to preserve and nurture students’ idealism. We believe that students’ idealism arises from meaningful, longitudinal relationships with patients.16 These central student–patient connections foster in students a sense of duty and provide an impetus to their learning. The HMS–CIC supported these relationships with curricular opportunities for self-reflection and group reflection. Ongoing mentoring by faculty also provided intergenerational problem-solving and support as ethical and professional issues arose. Learners and teachers collectively reviewed and processed important issues, creating a community focused on professionalism and service, intellectual rigor, and a commitment to improve the health care system.

Our program confirms the experiences of a number of longitudinal clinical programs, including the Yankton Model of the Sanford School of Medicine of the University of South Dakota,26 the longitudinal track at the University of Hawaii at Mānoa John A. Burns School of Medicine,24,25 The University of Minnesota Medical School’s Rural Physician Associate Program,26 the Cambridge Community-Based Clinical Course of the University of Cambridge School of Clinical Medicine,27 and the Parallel Rural Community Curriculum of the School of Medicine of Flinders University of Flinders, Australia,28 all of which have emphasized the use of longitudinal ambulatory sites for training third-year students, often with the mandate to train rural primary care physicians. The goal of our program is to

### Table 1

<table>
<thead>
<tr>
<th>Assessment measures</th>
<th>Traditional rotation control group</th>
<th>HMS–CIC</th>
<th>P value</th>
<th>Effect size</th>
<th>All others in third-year class</th>
<th>P value</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ob–Gyn Subject Exam</td>
<td>70.40</td>
<td>77.13</td>
<td>.204</td>
<td>.628</td>
<td>70.60</td>
<td>.242</td>
<td>.693</td>
</tr>
<tr>
<td>Pediatrics Subject Exam</td>
<td>74.22</td>
<td>76.25</td>
<td>.689</td>
<td>.198</td>
<td>71.04</td>
<td>.108</td>
<td>.590</td>
</tr>
<tr>
<td>Psychiatry Subject Exam</td>
<td>70.60</td>
<td>81.25</td>
<td>.128</td>
<td>.937</td>
<td>72.13</td>
<td>.011</td>
<td>.924</td>
</tr>
<tr>
<td>Surgery Subject Exam</td>
<td>73.2</td>
<td>77.38</td>
<td>.437</td>
<td>.417</td>
<td>70.87</td>
<td>.220</td>
<td>.694</td>
</tr>
<tr>
<td>HMS OSCE</td>
<td>63.9</td>
<td>70</td>
<td>.143</td>
<td>.821</td>
<td>60.8</td>
<td>.001</td>
<td>1.31</td>
</tr>
<tr>
<td>Comprehensive Clinical Science Self-Assessment</td>
<td>398.9</td>
<td>513.8</td>
<td>.043</td>
<td>1.07</td>
<td>na</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Tasks of Medicine Scale ranking of psychosocial tasks (at start of clinical year)</td>
<td>3.35</td>
<td>3.93</td>
<td>.172</td>
<td>.60</td>
<td>na</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Tasks of Medicine Scale ranking of psychosocial tasks (at end of clinical year)</td>
<td>3.12</td>
<td>4.22</td>
<td>.007</td>
<td>1.54</td>
<td>na</td>
<td>na</td>
<td>na</td>
</tr>
</tbody>
</table>

*The end-of-year tests covered content knowledge, skills, and professionalism. The scores of the eight students in the HMC–CIC were compared with the scores of 11 students in traditional HMS third-year clerkships and with the scores of all other members of the HMS third-year class. na, not applicable.
facilitate the learning of the core knowledge and skills required for the undifferentiated student, regardless of specialty interest. We ensure that HMS–CIC students learn directly from both generalists and specialists, allowing them to benefit from the important perspectives and skills of each to build a foundation of broad general knowledge and skills of discipline-specific knowledge and skills.

There were several types of obstacles encountered: fiscal/physical, cultural/political, pedagogical, and operational. Fiscal obstacles included the start-up costs of planning and implementing the program and the ongoing administrative costs. The model reimburses faculty teaching time instead of relying on free resident time, and it requires adequate space for students to see ambulatory patients, study, meet, and sleep. Our institutional administration willingly invested in the program, recognizing its potential to support the hospital’s mission to improve education and the quality of patient care.

Traditional departmental structure creates both a cultural ethos and a functional unit for traditional training. Our program required new cross-disciplinary collaboration and the balancing of interests in the areas of scheduling, curriculum development, the didactic tutorial curriculum, assessment, oversight, and mentoring. The development of strong multidisciplinary steering and program committees has provided vehicles for collaborative planning and the resolution of differences.

The innovative nature of the program prompted significant changes in traditional departmental teaching. Many faculty members did not initially believe they could teach sufficient content from their discipline solely in the office setting. They also were concerned about the lack of time given to immersion in inpatient acute medicine and about the lack of connection with inpatient teams. Faculty needed to learn to use longitudinal patient care as a vehicle for students to learn progressively. In addition, for the didactic curriculum to integrate basic sciences and social sciences seamlessly with clinical sciences required ongoing, deliberate attention.

Operationally, because faculty initially had concerns about the potential for insufficient exposure to severe or acute illness, faculty and students tended to overschedule their clinical and didactic experiences. Students, motivated by their sense of responsibility to their patients, spontaneously chose to work longer hours than did their traditional peers. This created the need for all disciplines to adjust the intensity early in the year and to institute a developmental progression of responsibility and expectations. Students felt conflicted when important patient-centered learning experiences were occurring simultaneously—for example, a planned clinic follow-up visit at the same time as a specialty consultation, delivery, surgery, or inpatient procedure. The program committee developed guidelines to assist students in prioritizing their time and to assist faculty in being flexible.

The organizational challenges required institutional commitments of money, space, and faculty time. Leadership support and an ongoing faculty development program nurtured the evolution of the teaching faculty’s commitment and ability. The political and operational challenges required a dedicated process of multidisciplinary collaboration and governance. Resolution of the logistical challenges was greatly aided by an information technology system that permitted students to monitor their patients’ visits. And, most important, students’ dedication to their patients and enthusiasm for their own learning engaged them in actively finding ways to stay in touch with their patients and their patients’ care providers.

Our intervention was a pilot program of small size, with randomly chosen but volunteer participants. The control group also consisted of a small volunteer group. The groups were found to be comparable on all those measures that we investigated, but it is still possible that the intervention and control groups may have differed initially in ways that we were not able to assess. It will be necessary to see whether the findings of this first cohort will be replicated as subsequent groups of integrated clerkship students and controls are studied. In addition, although the value of the intervention has a great deal of face validity, one cannot rule out that our students’ motivation at being part of the innovation may have influenced their performance (although the same influence could apply to the control group students). Nor can we identify which aspects of the intervention were most critical in generating whatever positive effects we observed. All of these factors limit the conclusions that can be drawn.

Our pilot was successful in a small hospital with highly motivated faculty

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**Table 2**

**Mean Ratings on Six Questions by Eight Harvard Medical School–Cambridge Integrated Clerkship (HMS–CIC) Students and 11 Students in Traditional Harvard Medical School Third-Year Clerkships, Harvard Medical School, 2005**

<table>
<thead>
<tr>
<th>Question: How much has your clinical year prepared you . . .</th>
<th>HMS–CIC students’ ranking</th>
<th>Traditional clerkship students’ ranking</th>
<th>P value</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>to be truly caring in dealing with patients?</td>
<td>5.75</td>
<td>4.90</td>
<td>.03</td>
<td>1.21</td>
</tr>
<tr>
<td>to deal with ethical dilemmas?</td>
<td>5.13</td>
<td>3.70</td>
<td>.01</td>
<td>1.36</td>
</tr>
<tr>
<td>to see how the social context affects patients and their problems?</td>
<td>5.75</td>
<td>4.70</td>
<td>.01</td>
<td>1.41</td>
</tr>
<tr>
<td>to involve patients in decision making?</td>
<td>5.50</td>
<td>4.40</td>
<td>.03</td>
<td>1.18</td>
</tr>
<tr>
<td>to relate well to a diverse patient population?</td>
<td>5.88</td>
<td>5.10</td>
<td>.02</td>
<td>1.34</td>
</tr>
<tr>
<td>to be a self-reflective practitioner?</td>
<td>5.50</td>
<td>4.10</td>
<td>.01</td>
<td>1.48</td>
</tr>
</tbody>
</table>

* Ratings were on a scale where 1 = very poorly and 6 = very well.

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**Educational Innovations**
ongoing costs will not be substantially higher than the real, but often hidden, costs of traditional clerkship training, especially in larger institutions where economies of scale and access to patients and specialists curtail unit costs. We believe that the value of increased exposure to experienced teachers and of more meaningful learning experiences with patients justifies some increased expenditure.

A Promising Model

We believe the longitudinal integrated clerkship model offers many potential benefits in the training of students in their principal clinical year, but the model needs to be studied with more students and in larger institutions. The collaborative process involved in creating and implementing an integrated clerkship serves not only the teaching program; it has wider positive implications for the host institution and for cross-disciplinary patient care—benefits that go beyond the scope of this article.

When HMS introduced its New Pathway curriculum 20 years ago, concerns were raised that a more integrated structure would sacrifice the depth of discipline-specific learning. Similar questions have been raised with the HMS–CIC: whether students can gain a sufficient fund of knowledge in each of the core disciplines without spending periods of dedicated time immersed in each one. Our pilot clerkship has shown that not only did students learn and retain content knowledge and clinical skills at least as well as their traditional counterparts, but also that this new model of education results in higher levels of self-reported acquisition of important core skills of doctoring.

The HMS–CIC is distinctly different from traditional third-year medical education (see List 1). In its pilot year, the model was highly successful in achieving its structural goals and its outcome goals. The HMS–CIC students were able to follow a significant number of patients through an entire course of illness, actively participating in the core skills of doctoring: information gathering; diagnostic reasoning; the planning, implementation, and assessment of therapy; and the provision of comfort and support to the patient. Longitudinal relationships with faculty provided students with the time and connections necessary to enable meaningful mentoring. Outcome data show that HMS–CIC students performed at least as well in tests of content knowledge and clinical skills and that they considered themselves better prepared in a number of core professional skills. There are plans to continue to study these HMS–CIC students as they pursue their fourth-year clerkships and residency training. Our hope is that they will maintain both their intellectual rigor and the strong patient-centered attitudes that have been nurtured by their third-year experience and that they will, in fact, become agents of change for a return to a more effective, humanistic, and fulfilling practice of medicine.

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