A New Clinical Skills Clerkship for Medical Students
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BACKGROUND AND OBJECTIVES: The transition to clinical clerkships can be challenging for medical students. In the context of a formal clinical curriculum redesign, a curriculum team led by family physicians systematically planned and implemented a 3-week course to prepare new third-year students for specialty-specific clerkships.

METHODS: Informed by a formal needs assessment, we developed a classroom-based Clinical Skills Clerkship (CSC) with varied instructional approaches. The three major curriculum components are (1) specialty-specific, longitudinal clinical care of a three-generation virtual family that is taught in lectures and small groups and assessed with an objective structured clinical examination (OSCE), (2) clinical skills including procedure stations and interprofessional education experiences, and (3) a series of professional development activities. The CSC has 90 hours of curriculum taught by more than 120 faculty members from a wide variety of specialties and disciplines. A cohort of senior medical students teach in the course as part of a medical education elective.

RESULTS: The CSC was first delivered to 98 students in 2012 who performed well on the course’s OSCE. Quantitative and qualitative evaluations of both the curriculum components and the senior medical student teachers were positive. Performance on comparable CSC and Internal Medicine Clerkship OSCE stations and a series of student focus groups demonstrate longer-term impact.

CONCLUSIONS: A successful curriculum redesign requires considerable planning and coordination. We designed and implemented a comprehensive CSC that was both well received and effective. Peer teaching programs can provide medical education leadership experiences with benefits for learners, teachers, and medical educators.

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impression-crystallization process to identify emerging themes (see Table 1). The clearest theme was the need for a better transition between the preclinical and clinical years. The Doctoring program curriculum team strongly considered longitudinally integrated curricula given recent evidence suggesting its benefits. However, given the challenging logistics and historically variable success at our institution of integrating curriculum across clinical clerkships, we decided that any new curriculum would need to be outside of and complementary to existing specialty-specific courses. To make room for a new 3-week CSC while still preserving students’ time to prepare for the USMLE Step 1 exam, the Curriculum Committee systematically shortened the second-year basic science curriculum by 3 weeks over 2 years.

We used the results of the original needs assessment and the expertise of the medical school’s Curriculum Committee to determine course content. We developed three major curriculum components (Appendix 1 available from lead author on request), wrote learning objectives, determined teaching strategies, and planned both a robust assessment strategy of the students and an evaluation plan for the curriculum. A representative from the Institutional Review Board (IRB) at our university determined that this required curriculum development and implementation process did not meet the federal definition of human subjects.

### Table 1: Transitioning From the Preclinical to the Clinical Years at Alpert Medical School: Common Challenges Identified During the Development and Implementation of the Inaugural Clinical Skills Clerkship (CSC)

<table>
<thead>
<tr>
<th>Participants’ Views on Overall Preparation for the Clerkships</th>
<th>Participants’ Views of Clinical Skills Preparation and Progression Toward Clinical Competence</th>
<th>Participants’ Understanding of Professional Role in the Clinical Setting</th>
</tr>
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<tbody>
<tr>
<td>CSC Planning (June 2009)</td>
<td>• Sharp divide between preclinical and clinical years</td>
<td>• Determining your role as a medical student in clinical settings</td>
</tr>
<tr>
<td>Recent medical school graduates (n=6)</td>
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<tr>
<td>Final pre-CSC cohort (March 2013)</td>
<td>Comments focus on initial anxiety and frustration: • “I felt lost.” First clerkship was</td>
<td>Comments reflect a multidimensional role definition: • Determining your role as a medical student in clinical settings</td>
</tr>
<tr>
<td>Fourth-year medical students who participated in a pre-CSC orientation in 2011 (n=8)</td>
<td>“wasted.”</td>
<td></td>
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<tr>
<td>First CSC cohort (February 2013)</td>
<td>Comments relate to integrating knowledge and skills and determining the priorities of the core clerkships: • “Third year is a lot of putting together Doctoring and [basic science] materials.”</td>
<td>Comments center on advanced clinical skills and clinical decision-making: • Synthesizing information to make a cogent assessment of a patient’s illness or disease</td>
</tr>
<tr>
<td>Third-year medical students who participated in the inaugural CSC in 2012 (n=10)</td>
<td></td>
<td>Comments embody a more complex view of role on the health-care team: • Determining your role as a medical student in clinical settings • Adjusting to “learning from people you are also trying to impress” • Navigating teamwork with difficult colleagues</td>
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</table>

H+P—history and physical
research and therefore did not require a formal IRB review.

The Clinical Skills Clerkship Curriculum
The goal of the new CSC is to effectively prepare rising third-year medical students for their six required clinical clerkships in family medicine, obstetrics and gynecology, pediatrics, internal medicine, surgery, and psychiatry. We conducted the first course in 2012 with three course leaders, including two family physicians and one nurse. The first CSC included 90 hours of new curriculum taught by more than 120 faculty members from a variety of medical specialties and health care disciplines.

The CSC has three main content areas: a virtual family curriculum, clinical skills training, and professional development. The virtual family curriculum introduces students to different medical specialties and clinical skills via a fictional multigenerational family that encounters each of the core medical and surgical specialties as they travel through the health care system. The clinical skills training provides students interactive experiences with common clinical procedures as well as interprofessional education (IPE) and teamwork. The professionalism curriculum focuses on practical strategies for maximizing students’ experience as learners and health care team members in a series of new clinical learning environments. The complete course schedule and syllabus can be found in the STFM Resource Library (www.fmdrl.org).

We created a password-protected e-syllabus. We assessed students on the last day of the course with a six-station objective structured clinical examination (OSCE) based on the virtual family curriculum. OSCE stations and checklists were created and piloted by medical students and faculty in advance of the course. Course grading options are pass/fail based on attendance, participation, and OSCE performance.

Peer Teachers
Much of the CSC curriculum is taught or co-taught by a core team of 12 senior medical students participating in a 4-week medical education elective led by a senior medical student as part of his or her 3-year Medical Education Scholarly Concentration work. The team of senior medical students has a myriad of teaching responsibilities in the CSC that include facilitating small-group sessions, giving large-group lectures, supervising procedure stations, providing individual peer counseling, and grading OSCE stations, all under the guidance of course leaders.

Assessment and Evaluation
A six-station summative OSCE was piloted and refined before the CSC by course leaders and senior medical students who mapped the course objectives to the stations and checklists. On the last day of the clerkship, OSCE stations were graded in real time by the senior medical students under the supervision of course leaders. The passing threshold of the OSCE was set at 70% completion of checklist items using the Angoff method. Students were required to pass each station in order to pass the OSCE itself.

We designed a course evaluation form that focused on students’ educational experiences with course components using both open-ended and closed-ended questions. The family medicine course leaders independently evaluated responses to the open-ended questions to elicit themes and then met to agree on these themes. Given our interest in getting high-quality evaluations, we concentrated our administrative efforts on getting comprehensive course evaluations and teaching evaluations for the 12 senior medical students. We deliberately did not gather individual teaching evaluations for the many other faculty who taught in this first course.

Impact
We conducted two more focus groups in the spring of 2013: one with volunteer fourth-year students from the last class of students who transitioned to their clinical training the year before the CSC was offered, the other with third-year students enrolled in the Family Medicine Clerkship 9 months after they took the inaugural course. Both focus groups were co-facilitated by the director of the Office of Medical Education (RD) and a senior medical student (MM). In analyzing the qualitative data, the facilitators used a form of the immersion-crystallization process by independently reading in detail and reflecting on the focus group recordings as they extracted major themes. They then met and agreed on emergent themes. Finally, we compared student demographics and OSCE performances on the third-year Internal Medicine Clerkship across two classes of students. Comparable OSCE stations from the CSC and the Internal Medicine Clerkship included chest x-rays (CXR) and electrocardiograms (ECG). We analyzed quantitative information by using IBM SPSS Statistics 20.0 (SPSS, Inc, 2011, Chicago, IL, www.spss.com) to perform independent t tests and multivariate linear regression models. Models included age, gender, and United States Medical Licensing Examination (USMLE) Step 1 scores as continuous variables and underrepresented minority (URM) status as a categorical variable. Statistical significance was set at P<.05.

Results
In 2012, 98 rising third-year medical students took the first CSC. Overall, more than 120 faculty members participated in the course, including all of the teachers from the Year 2 clinical skills course at our institution (n=30, including 15 physicians and 15 faculty from nursing, social work, and public health), specialty-specific Year 3 clerkship directors (n=15), basic science faculty (n=6), clinical faculty (n=41), nursing and pharmacy faculty (n=13), residents and chief residents (n=5), and one operating room technician. In addition to the
12 seniors in the medical education elective, another 20 medical students with leadership roles at the school taught in the CSC.

On the last day of the course, senior medical students graded the summative OSCE using predetermined checklists with a cut-off grade of 70%. Every student passed the summative OSCE, and 90% (88/98) of students passed each individual component of the OSCE on the first try. Every student passed the following stations: admission history and physical, CXR, EKG, and an evidence-based medicine (EBM) search. The suturing station necessitated 10 remediations, primarily due to logistical difficulties with knot tying. There was considerable variability in the quality of the Admitting Orders but only two students for whom remediations were suggested. The response rate for written course evaluations was 85% (83/98). In its first year, components of the course were among the highest rated curriculum components of any at the medical school (Table 2). Students rated the virtual family cases and the clinical procedure training sessions highly. The professionalism curriculum evaluations were the most variable, both quantitatively and qualitatively. Many of the individual suggestions made by students about how to improve the course revolved around scheduling and logistics but often contradicted each other, making it hard to perceive patterns.

The three related themes that emerged from the longitudinal qualitative data analysis, three focus groups over 5 years involving a total of 24 people, centered on the challenges of the transition to the third year: overall preparedness for the clerkships, clinical skills preparation and progression toward clinical competence, and learning the professional role in the clinical environment (Table 1). Focus group discussions held almost 1 year after the inaugural CSC demonstrated that fourth-year students, who had not been offered this transition course, struggled with starting clinical clerkships because they lacked key clinical and professionalism skills. In contrast, although still challenged by site-specific workplace issues, the third-year students who had participated in the inaugural CSC did feel better prepared than their more senior colleagues, particularly with respect to clinical skills such as written documentation.

Finally, we compared two classes of students demographically and

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<th>Table 2: Course Evaluations of the First Clinical Skills Clerkship (CSC)*</th>
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<td><strong>1. Virtual Family Curriculum</strong> = 5.17/6 (SD=0.93)</td>
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</table>
| • "I really enjoyed the small-group structure. It was a comfortable environment that really helped me feel supported and excited to learn throughout this clerkship."
| • "The virtual family/small-group sessions were extremely valuable in getting us prepared for tasks we will need to complete on the wards."
| • "I learned a lot of critical new skills and enjoyed the sessions very much."
| • "I'd almost suggest having us write notes and practice oral presentations every day—it will be tedious during the clerkship, but we'd all be SO thankful afterwards."

| **2. Clinical Skills Training** = 5.60/6 (SD=0.64)             |
| • "Procedure training was phenomenal. I'm a hands-on person and loved every station."
| • "My favorite component was definitely the procedure days. All of you did a phenomenal job bringing together experts from many different fields and giving us lots of hands-on training time."
| • "The procedure training days were very fun and effective because it was so interactive. It was good to get hands-on experience in drawing blood and putting in an IV, etc."
| • "I enjoyed the clinical procedure sessions the most (suturing, IVs, phlebotomy, wound care, etc). They introduced basic clinical procedures that I have been wanting to learn for some time. It will be useful to have at least seen these procedures once before starting our rotations in the hospital."

| **3. Professional Development** = 4.05/6 (SD=1.32)            |
| • "The meditation/wellness afternoon was awesome."
| • "I left the [meditation] session bored and frustrated (because it lasted an entire hour where I could have been doing something else) and am much less likely to consider meditation now."
| • "Going the whole day without breaks was draining."
| • "Decrease down time."

| **4. Senior Medical Student Peer Teachers** = 5.60/6 (SD=0.64) |
| • "The philosophy of MS4s coming back and teaching new MS3s is great. It really does feel like passing the torch."
| • "I appreciated the opportunity to learn from third- and fourth-year students. They were especially good at teaching note writing and oral presentations because they remember what it was like to not know how to do those things."
| • "It was so cool to see the fourth-years in action. They are awesome and now I have a great idea of the type of student I will be striving to be over the next two years."

* Scale: 1=poor, 6=excellent
SD—standard deviation
## Figure 1: A Logic Model for the inaugural Clinical Skills Clerkship (CSC)
at Alpert Medical School of Brown University, 2012

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Outputs</th>
<th>Participation</th>
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<tbody>
<tr>
<td><strong>Learners:</strong> Rising third-year medical students</td>
<td><strong>Who we reach:</strong> All rising third-year medical students at one institution (n=98)</td>
<td><strong>Short</strong>&lt;br&gt;For rising third-year medical students: Attendance&lt;br&gt;Timely completion of written assignments&lt;br&gt;Successful performance on a 6-station OSCE*&lt;br&gt;Clearly articulated professionalism skills including self-directed learning, reflection, and self-care goals</td>
</tr>
<tr>
<td><strong>Teachers:</strong> Graduating fourth-year medical students</td>
<td><strong>For graduating fourth-year medical students:</strong> Crystallization of key clinical skills&lt;br&gt;A variety of teaching experiences - Small group facilitation - Public speaking - Peer mentoring - Feedback and evaluation</td>
<td><strong>Medium</strong>&lt;br&gt;Clinical skills including interpretation of CXRs and EKGs* (third-year Internal Medicine Clerkship OSCE*)&lt;br&gt;Professionalism skills demonstrated at specialty-specific clinical sites&lt;br&gt;The ability to function as a member of a team</td>
</tr>
<tr>
<td>Physician faculty from a wide variety of medical and surgical specialties</td>
<td><strong>For graduating fourth-year medical students:</strong> Appreciation for curriculum development and student assessment processes in medical education&lt;br&gt;Increased comfort with teaching medical students during internship and residency training</td>
<td><strong>Long</strong>&lt;br&gt;Successful performance/grades during clinical clerkships&lt;br&gt;An interest in taking the medical education elective as a fourth-year student&lt;br&gt;A well informed specialty choice</td>
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<tr>
<td><strong>Non-physician health care providers</strong></td>
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<tr>
<td><strong>Administrators:</strong> Two family medicine CSC course leaders</td>
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<tr>
<td>Year 1 and 2 Doctoring Program course leaders</td>
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<tr>
<td>Year 3 clinical Clerkship Directors (6 specialties)</td>
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<td></td>
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<tr>
<td>Course coordinators</td>
<td></td>
<td></td>
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<tr>
<td><strong>Curriculum:</strong> Paper cases, videotaped scenarios, and faculty guides</td>
<td><strong>Interprofessional education (IPE)</strong>&lt;br&gt;AAMC’s* Careers in Medicine (CIM)&lt;br&gt;Wellness and self-care</td>
<td></td>
</tr>
<tr>
<td>An e-syllabus</td>
<td><strong>For graduating fourth-year medical students:</strong> Strong teaching evaluations during residency training&lt;br&gt;Participation in an education track or program&lt;br&gt;A career in academic medicine/leadership in medical education</td>
<td></td>
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### Assumptions
- At our school, clinical clerkships are developed, administered, and evaluated independently.
- Some components of clinical clerkships are not specialty-specific and maybe could be centralized and offered once rather than repeated with each clerkship.

### External Factors
- The clinical curriculum in Doctoring Years 1 and 2 (before) and the specialty-specific clinical clerkships (after) is fluid so that a successfully integrated transition curriculum will require annual revisions.
- Clinical faculty available and trained for classroom teaching are a valuable but rare resource.

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* AAMC = Association of American Medical Colleges<br>OSCE = Objective structured clinical examination<br>CXR = Chest x-rays<br>EKG = Electrocardiograms

Logic Model Template: http://www.uwex.edu/ces/pdande/evaluation/evallog model.html
with respect to their performances on the third-year Internal Medicine Clerkship OSCE. The students in the graduating class of 2013, who did not take the CSC, and those in the graduating class of 2014, who took the first CSC, were demographically and statistically similar with respect to gender, URM status, and USMLE Step 1 scores. Students in the class of 2013 were older than those in the class of 2014 (23.0 versus 22.1 years old, \( P = .011 \)). The first class of students who participated in the CSC scored significantly better on the CXR and EKG stations than the students in the previous year (CXR: mean rose from 6.05 to 6.90 out of 10, \( P = .0 \), EKG: mean rose from 7.60 to 8.17 out of 10, \( P = .002 \)). This effect persisted when controlling for Step 1 scores, however was extinguished when controlling for age and URM status.

**Discussion**

Using a systematic curriculum development process in the context of a larger, integrated clinical curriculum redesign at our institution, we successfully designed and administered a well-received and effective transition course within a 4-year Doctoring program. Overall, third-year students who took the CSC felt better prepared to start their specialty-specific clerkships, both subjectively and objectively. The strengths of our content include the innovative virtual family curriculum, the extensive procedural training, and the varied instructional approaches incorporated into the new course. This kind of transition course, or components of it, may be especially valuable for medical students at schools with a more traditional curriculum that does not include substantial clinical exposure in the first 2 years of medical school.

Small-group learning promotes deeper understanding of material, enhances problem-solving skills, encourages participation, and develops team communication skills applicable throughout one's career in medicine. The positive evaluations of the virtual family curriculum, the procedural stations, and the medical student teachers affirm the effectiveness of the small-group format in this course.

Clinical skills practice is an important pedagogical strategy to decrease anxiety and increase confidence among medical students about to begin their clerkships.\(^22\) Further, the experience in procedural training students receive in Years 3 and 4 can vary greatly among clerkships and institutions, which results in continued anxiety and a lack of competency in performing procedures.\(^{23-24}\) As such, we deliberately incorporated a significant amount of procedural skills training into the CSC. Not only was it a positively evaluated component of the clerkship, but this strategy also standardizes procedural training for all rising third-year students and ensures basic competency. The biggest challenge for this component of the curriculum was scheduling and orienting the clinical faculty teachers. Given that this curriculum takes 4 full days, medical schools that already have procedure training embedded into their second-year clinical skills courses, which we do not, could offer a shorter transition course.

Interprofessional education is a central component of this clerkship that includes all three core components of the course: clinical knowledge, procedure training, and professionalism. As course leaders and faculty, we see the IPE sessions in the CSC as an important foundation for “real” team experiences in clinical settings, similar to the transition from standardized to real patients for medical interviewing and physical examinations.

Not surprisingly, the professionalism curriculum received the lowest and most variable ratings by the students. We hypothesize that this is due to two factors: a wide range of personal learning styles, making it challenging to develop curriculum that appeals to everyone, and the hypothetical, non-contextualized nature of the issues at hand. In the future, we may consider moving some of the professionalism topics into both medical school orientation events and specialty-specific clinical clerkships so that they become more experiential, contextualized, and longitudinal.

Peer mentorship was also well received in this clerkship. On course evaluations, rising third-year students rated senior medical students’ effectiveness with specific educational skills such as facilitation and giving feedback very highly. By having a similar but more comprehensive knowledge base, the senior medical students can help junior students better understand basic clinical and professionalism concepts, referred to as “cognitive congruence.”\(^25\) Peer mentors also have a “social congruence” with their more junior colleagues, allowing them to help alleviate students’ anxieties around this important transition. For these reasons, peer mentorship is thought to be particularly effective in times of transition, including moving from a preclinical to clinical situation.\(^26\)

One specific area for future refinement is the selection and admission process into the invitation only, 1-month medical education elective.

Cost can be an important consideration in a large, complex course involving multiple teaching resources. Aside from ongoing salary support for the existing key course faculty and staff in the Office of Medical Education who developed the bulk of the curriculum over 2 years, our biggest expense for this new clerkship was medical equipment and supplies. The use of peer mentors, in this case senior medical students who received elective credit instead of financial incentives, reduces costs, centralizes logistics, and has benefits for both the mentors and mentees that we will continue to study as the teachers progress through their residency training.\(^26,27\)

In addition to following the original cohort of senior medical student teachers who participated in the medical education elective, our long-term evaluation strategy includes further studying of third-year
students’ performance on the Internal Medicine Clerkship OSCE and continuing to compare student performances across years as we refine the transition course. As with the curriculum planning process, the systematic input of clerkship directors with respect to the impact of the CSC on students’ clinical skills and professionalism will be invaluable. These diverse evaluation strategies will assist us to revise the CSC for future medical students. We also hope these approaches will enhance our understanding of the potential roles of peer mentoring in undergraduate medical education.

In conclusion, under the leadership of family physicians, we developed and implemented an intensive 3-week transition course as one component of a 4-year clinical skills Doctoring program. The systematic integration of a CSC and a medical education elective has been logistically daunting but both well-received and cost effective. These linked experiences provide all rising third-year medical students with regular opportunities to interact with trained peer-mentors and allow select fourth-year medical students to obtain substantive formal teaching experience early in their medical careers. We will now continue to systematically and longitudinally evaluate the experience to refine both courses for future students. The CSC structure and new curriculum, either as individual components or in its entirety, are modifiable and transferrable to other courses and institutions.

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References


