Michigan State University College of Human Medicine
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Medical Education Program Highlights
The novel Shared Discovery Curriculum (SDC) was implemented in 2016. Its pillars are 3 progressive, longitudinal experiences: the early clinical experience (ECE, year 1), middle clinical experience (MCE, year 2), and late clinical experience (LCE, years 3 and 4). Students learn in authentic patient care environments starting week 9 of medical school. This early interprofessional team engagement enables students to quickly become clinically useful. Clinical experiences require students to integrate their necessary (basic, clinical, and social) science knowledge into the context of authentic patient care.

SDC content is sequenced by what students experience in the clinic or hospital and organized by chief complaints and concerns, rather than disciplines or organ systems, requiring a conceptually advanced framework. Chief Complaints and Concerns (C3) documents define educational end competencies. These are templated using the biopsychosocial model of clinical reasoning, integrating applicable necessary science content. Integration of end competencies with real-world patient care prepares students for how problems are encountered and solved in residency and practice.

The student experience is organized within 1 of 4 learning societies; they provide the structure for small-group learning, faculty coaching, and mentoring. The learning societies have a central role in delivering necessary science content. All learning society faculty convene as an academy, which meets regularly for educator development and support.

Our assessment system is competency based and uses progress testing: all students complete a standardized knowledge and skills assessment suite each semester. Assessments are purposefully aligned with real-world performance requirements to drive relevant continuous improvement of learners and curriculum. This robust assessment strategy includes frequent formative feedback and multimodal summative assessment of each competency. We are the only medical school using high-stakes testing to determine graduation competency. Students have consistently performed better than predicted on national certifying examinations, with a significant positive gain since implementation of the SDC.

Just In Time (JIT) Medicine software (https://www.justintimemedicine.com/) powers our curriculum and assessment, providing a transformational link between content and assessment. It enables the convenient acquisition of real-time, workplace-based assessment. Each student’s performance dashboard resides on JIT, readily accessible to students and faculty.

Curriculum
Curriculum description
Our 3 clinical experiences reify the philosophy and goals of the SDC. The 24-week ECE begins with learning multiple patient care tasks and their underlying necessary science. Certified safe and useful, students spend 16 weeks in ambulatory clinics caring for patients with their clinic team. The curriculum directly integrates learning about communication and clinical skills, ethics, patient safety science, the social context of clinical decisions, and the biological science behind clinical findings with this foundational patient care experience.

Learning objectives are covered using experiential methodologies in large and small groups and guided study. Weekly simulation sessions form a cornerstone of the curriculum, placing learners in a realistic, safe environment where formative feedback guides improvement. Necessary science is integrated into simulation regularly, providing ongoing opportunities to apply learning to clinical care.

From March to May of year 1, students take intersessions based on individual needs and interests. Some of the intersessions contribute to specialized certificate programs. Certifications exist in leadership for the medically underserved, public health, and 2 rural health leadership options.

The MCE lasts 30 weeks, consisting of ambulatory and inpatient rotations. Each emphasizes integration of clinical work and underlying necessary biological and social sciences required for patient care and work within the health care system. Students learn from residents, attending physicians, and interdisciplinary team members. The MCE includes 5 medical specialty rotations: adult wards, pediatric wards, emergency medicine, newborn nursery, and ambulatory women’s health. Students engage in 7 interprofessional rotations: physical therapy, nutrition, pharmacy, respiratory therapy, care management, pain and palliative care, and nursing. They learn the necessary sciences applicable to myriad chief complaints and concerns while garnering robust appreciation for the contributions of health team members.

After the MCE, students have 2 months of intersessions concentrated on areas of need or interest, including a USMLE Step 1 examination preparatory intersession before testing and a summer break.

The LCE engages students in traditional disciplinary clerkships, spending 4–8 weeks on rotations in internal medicine, family
Academic Medicine, Vol. 95, No. 9 / September Supplement 2020

Curriculum changes since 2010

SDC planning began in 2008. Guiding principles were ratified in 2011, and the ECE was piloted in 2013. We welcomed our first SDC class in 2016. Guiding principles are:

• Early and ongoing clinical experiences where students are useful
• Necessary science learning integrated with patient care experiences
• Biopsychosocial model of patient care
• Collaborative learning for faculty and students
• Interprofessional training to foster safety and quality
• Technology-enhanced curriculum and assessment
• Alignment of assessment with curricular content and real-world performance
• Assuring competence and striving for excellence

Assessment

Program objectives are described in outcome-based terms that allow the assessment of medical students’ progress in developing the competencies that the profession and public expect of a physician (LCME or CACMS standards).

See Table 1—Program Objectives and Assessment Methods.

Our competency framework is service, care of patients, rationality, integration, professionalism, and transformation. Except for service, our competencies map to ACGME competencies and contain 25 subcompetencies. Each subcompetency has behaviorally specified milestones that describe critical deficiencies or educational “never events,” as well as novice, developing, and competent learners. The College Competence Committee determines grade recommendations by reviewing student portfolios of evidence against course competency milestone requirements.

Our assessment progress suite includes NBME Comprehensive Necessary Science Examinations (CBSE, CAS, or CCSE), a progress clinical skills examination (PCSE), workplace-based assessments and Core Entrustable Professional Activities assessments, portfolio artifact review, multisource and peer feedback, and students’ individual learning plans.

The PCSE is an 8-station OSCE with 15-minute stations followed by a postencounter task. Competencies assessed are interactional skills, hypothesis-driven history-taking, hypothesis-driven physical examination, counseling, safety, clinical reasoning and documentation, and necessary science applications to patient care.

Three-year curriculum

We are analyzing data from our progress suite and clerkships to determine how to enable students to complete the curriculum in less than 4 years.

Pedagogy

We use case-based learning, ambulatory and inpatient clinical experiences, large- and small-group discussions, laboratory, peer teaching, simulation, standardized/simulated patients, team-based learning, videos/podcasts, virtual patients, workshops, and guided problem–based learning methodologies.

We use a small number of traditional lectures, having adopted most of the above methodologies where best suited to specific competencies.

Clinical experiences

In the ECE, we use primary care offices (internal medicine, family medicine, med–peds, pediatrics) and some urgent care locations. In the MCE, we use hospital system partners for inpatient experiences as well as outpatient offices providing women’s health services.

Required longitudinal experiences

For 15 weeks during the ECE, students spend 2 half days a week in the same primary care office working with the care team. Rural Community Health Program students are longitudinally assigned to a rural community for multiple clerkships.

Clinical experience first encounter

Our students begin clinics in the ninth week of the ECE.

Required and elective community-based rotations

We are a community-based medical school with two 4-year campuses and 7 campuses for third- and fourth-year students. In the ECE, students are assigned to community-based clinics. At each campus, students do required and elective rotations within partner hospital systems, ambulatory sites, and Veteran’s Administration facilities, where they exist.

Challenges in designing and implementing clinical experiences for medical students

Clinical sites are crowded with multiple health care professions learners, implementing new EHR systems, invoking new efficiency and safety processes, and feeling financial productivity pressures. We regularly communicate clinical experience goals for first-, second-, and more traditional third-year clerkship students to our sites; that faculty and site-development work is ongoing and critical for placing...
Table 1
Program Objectives and Assessment Methods

<table>
<thead>
<tr>
<th>Competency</th>
<th>End-curriculum behavioral outcomes</th>
<th>Longitudinal assessment</th>
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<tbody>
<tr>
<td>Service (no corresponding ACGME competency)</td>
<td>• Participates in the provision of beneficial services within the community&lt;br&gt; • Demonstrates preparation and planning to provide services which respond to community need&lt;br&gt; • Demonstrates reflection on their participation in service activities</td>
<td>• Service learning project(s) with planning documents and reflection</td>
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<tr>
<td>Care of patients (corresponds to ACGME patient care and interpersonal and communication skills)</td>
<td>• Demonstrates kindness and compassion to patients and their families&lt;br&gt; • Collects complete and accurate patient data&lt;br&gt; • Synthesizes patient and laboratory data to formulate reasonable assessments and plans&lt;br&gt; • Demonstrates the incorporation of patient values into illness assessment and care plans&lt;br&gt; • Communicates effectively in writing and orally&lt;br&gt; • Effectively counsels and educates patients and their families</td>
<td>• Direct observations of performance in clinical settings&lt;br&gt; • Multisource feedback&lt;br&gt; • Progress Clinical Skills Examination&lt;br&gt; • Portfolio review</td>
</tr>
<tr>
<td>Rationality (corresponds to ACGME practice-based learning and improvement)</td>
<td>• Identifies personal strengths and weaknesses and develops ongoing individual learning plans&lt;br&gt; • Demonstrates use of faculty and peer/colleague feedback as a means of facilitating personal and professional improvement&lt;br&gt; • Locates, appraises, and assimilates evidence from scientific studies</td>
<td>• Multisource feedback&lt;br&gt; • Portfolio review</td>
</tr>
<tr>
<td>Integration (corresponds to ACGME systems-based practice)</td>
<td>• Demonstrates awareness of cost and access issues in the formulation of patient care plans&lt;br&gt; • Demonstrates respect for all members of the health care team&lt;br&gt; • Demonstrates understanding of and contributes to a culture of safety&lt;br&gt; • Demonstrates knowledge of different types of medical practice and delivery systems and their implications for controlling health care allocation and cost&lt;br&gt; • Demonstrates knowledge of how social and economic systems in which people live impact health, delivery of health care, and well-being</td>
<td>• Multisource feedback&lt;br&gt; • Portfolio review&lt;br&gt; • Progress Clinical Skills Examination</td>
</tr>
<tr>
<td>Professionalism (corresponds to ACGME professionalism)</td>
<td>• Demonstrates receptiveness to feedback from faculty/peers/colleagues/team members&lt;br&gt; • Contributes actively to group/team process&lt;br&gt; • Demonstrates respect to patients, colleagues, and team members&lt;br&gt; • Fulfills responsibilities in courses and on clinical rotations&lt;br&gt; • Takes responsibility for patient outcomes and is accountable to the team, the system of delivery, the patient, and the greater public</td>
<td>• Multisource feedback&lt;br&gt; • Portfolio review&lt;br&gt; • Progress Clinical Skills Examination</td>
</tr>
<tr>
<td>Transformation (corresponds to ACGME medical knowledge)</td>
<td>• Applies essential basic, social, clinical science, and systems knowledge in the care of patients&lt;br&gt; • Creates new knowledge through research&lt;br&gt; • Participates in lifelong teaching and learning with peers, trainees, and patients</td>
<td>• Comprehensive Necessary Science Examination&lt;br&gt; • Progress Clinical Skills Examination&lt;br&gt; • Portfolio review&lt;br&gt; • Multisource feedback</td>
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students earlier and enabling them as useful team members. After the 2013 pilot test, outpatient primary care sites reported unchanged or improved productivity with first-year students, important data as we expanded to almost 100 sites for our entering class.

For the MCE, we meet with multiple stakeholders at each partner institution to communicate rotation goals and enlist participation in these unique placements for second-year students. Multiple learners and changing roles for students comprise the biggest placement challenges.
**Education Staff**

The educational programs of the college exist within the Office of Academic Affairs, led by the senior associate dean for academic affairs. Admissions, student affairs, and continuing and graduate medical education reside within the office of Academic Affairs. The MD curricular program reports to Academic Affairs through the associate dean for undergraduate medical education, who is responsible for undergraduate medical education.

The college benefits from the Office of Medical Education Research and Development (OMERAD), a resource for faculty development, program evaluation, and data analysis.


**Faculty Development and Support in Education**

**Professional development for faculty as educators**

Broad participation from multiple departments formed a platform for the faculty development needed to create the curriculum’s innovative clinical, large-group, small-group, and guided study experiences. Participating faculty attended orientations to enable effective delivery of novel offerings. OMERAD offers a clinical educator program for academy fellows and ongoing faculty development occurs under direction of the clinical experience directors.

Small-group teaching in the first 2 years is accomplished within the academy by learning society fellows and by rotation small-group leaders who engage in specific orientation to teaching. Academy faculty participate in weekly half day sessions to enable functioning as master teachers and mentors.

**Role of teaching in promotion and tenure**

Teaching is 1 of 4 major review categories for promotion and tenure in the tenure track, clinician–educator, or health professions track. All faculty applying for promotion to associate or full professor must fulfill basic criteria in each of the 4 categories, and distinguished criteria in a required number depending on rank sought.

**Teaching academy**

The academy is the core of the SDC. Scholar groups of 7–8 students meet with a lead faculty fellow and small cadre of team fellows once or twice weekly during the ECE and MCE. This structure accomplishes multiple curricular goals, including post-clinic debriefing, guided case-based learning and other small-group learning experiences, student portfolio review, and individual learning plan coaching. The academy fosters longitudinal trusting relationships and a rich collegial environment for students and faculty. Lead faculty fellows are clinicians; team faculty include basic and social scientists and bioethicists.

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**Table 2**

**Regional Medical Campuses**

<table>
<thead>
<tr>
<th>Name of campus</th>
<th>Location</th>
<th>Curriculum phase</th>
<th>Student enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Preclerkship</td>
<td>Clerkship</td>
</tr>
<tr>
<td>Flint Campus</td>
<td>Flint, MI</td>
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<td>Grand Rapids, MI</td>
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<td>340</td>
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<td>Lansing Campus</td>
<td>Lansing, MI</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Midland Regional Campus</td>
<td>Midland, MI</td>
<td>X</td>
<td>30</td>
</tr>
<tr>
<td>Southeast Michigan Campus</td>
<td>Southfield, MI</td>
<td>X</td>
<td>50</td>
</tr>
<tr>
<td>Traverse City Campus</td>
<td>Traverse City, MI</td>
<td>X</td>
<td>24</td>
</tr>
<tr>
<td>Upper Peninsula Regional Campus</td>
<td>Marquette, MI</td>
<td>X</td>
<td>24</td>
</tr>
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Regional Medical Campuses
See Table 2—Regional Medical Campuses.

Educational experiences across sites
The curriculum is managed centrally by the College Curriculum Committee and implemented through Academic Affairs. The associate dean for undergraduate medical education and community assistant deans, who are responsible for curricular implementation in the clinical communities, report to the senior associate dean for academic affairs.

The ECE and MCE are uniquely designed to integrate students’ learning with patient care experiences, using 90 C3 documents to define the knowledge, skills, and behaviors required of graduates. End competencies from those documents are programmed into students’ learning experiences by week or by ASK course component and delivered to students by core faculty using the same materials and methods. All SDC faculty teachers attend teaching orientation sessions. Academy faculty have weekly educator development sessions aimed at standardizing small-group teaching. Intersessions lead faculty design and orient faculty who deliver those portions of the curriculum. Departmental clerkship committees composed of community clerkship directors design and implement departmental clerkships for comparable experiences and assessment across campuses. The director of the LCE supervises this process across departments and reports to the assistant dean for UME.