

The Third-Year Longitudinal Integrated Clerkship at the Asheville Campus of the University of North Carolina School of Medicine

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Consumers, health delivery planners, and public officials are calling for patient-centered, primary care-based, cost-effective health care. The Asheville campus of the University of North Carolina School of Medicine has responded to this need by developing a longitudinal integrated clerkship that trains third-year medical students to provide such care.

The University of North Carolina (UNC) School of Medicine launched its Asheville campus in July 2009 with 4 third-year medical students. The regional campus—a collaboration of the UNC School of Medicine, Mission Health System, and the Mountain Area Health Education Center—is part of UNC's broader strategy of expanding enrollment to meet North Carolina's need for more physicians [1]. The Asheville campus now has 10 third-year medical students, and this established program has outcomes data demonstrating its academic effectiveness and its positive impact on both students and faculty members.

Longitudinal integrated clerkships (LICs) are increasingly being recognized as an effective alternative to traditional block rotations for medical students [2, 3]. Key features of an LIC curriculum include students' participation in providing comprehensive care for an identified group of patients over time, and a continuous learning relationship with supervising clinician-preceptors. Through these experiences, LICs help students meet core clinical competencies across multiple disciplines simultaneously [4].

The Asheville campus of the UNC School of Medicine was the first location in North Carolina to offer an LIC curriculum. The LIC pairs students with attending physicians in each of the core third-year outpatient-based specialties; students participate in each specialty for a half-day per week throughout the third year. The typical third-year schedule is shown in Table 1. As a result of this schedule, students experience continuity with patients and physicians. Students also follow their patients over time through the health care system. The small class size and gradual expansion of the LIC program have enabled academic and clinical leaders in Asheville and Chapel Hill to refine the curriculum as needed, and this program has emerged nationally as an innovative educational companion to the changing health care system.

Traditionally third-year clinical training in US medical schools is structured such that the reference point is the clinical specialty or hospital service. In contrast, the patient is the educational reference point of the clinical experience in an LIC. The LIC patient-centered learning method allows the student to experience the health system from the patient's perspective as a series of specialties and silos that are often unconnected. From this perspective, the student can clearly see both the primary care provider's role as the care connector and the value of a better integrated health care system. Objective evidence shows that students become more aware of the patient's perspective because of this experience; compared with national norms, the patient-centeredness of LIC students (measured using the Patient-Practitioner Orientation Scale [5]) remains high after the third year.

Here is a typical scenario of a medical student enrolled in the LIC curriculum: Mrs. Smith is seen by medical student AJ at Dr. L's internal medicine office. An abdominal mass is detected on physical examination, and Mrs. Smith is scheduled for a computed tomography scan of the abdomen, which AJ attends. The mass is suspicious for an ovarian malignancy, and Dr. L and AJ meet with Mrs. Smith to discuss the results and plan their next steps. The patient is referred to a gynecological surgeon; again, the student is present with the patient both for the consultation and the subsequent surgery. The scenario might continue with visits to an oncologist, a geneticist, or even hospice care.

The LIC model offers several benefits. In traditional block rotations, students have blocks that last 4-8 weeks and concentrate on 1 discipline; thus faculty members and residents have little opportunity to get to know the student well enough to offer meaningful feedback and mentoring. In the LIC curriculum, students develop longer-term relationships with faculty, staff, patients, and other students in their cohort. End-of-year evaluations indicate high levels of stu-

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TABLE 1.
Sample Weekly Schedule for Longitudinal Integrated Clerkship Students at the Asheville Campus of the University of North Carolina School of Medicine

Time of Day	Monday	Tuesday	Wednesday	Thursday	Friday
7:00 AM – 8:00 AM	Round on inpatients, morning conferences, master clinician ^a , or radiology				
8:30 AM – 12:30 PM	Internal medicine outpatients	Testing or self-directed learning	Pediatric outpatients	Family medicine outpatients	Self-directed learning
1:30 PM – 5:30 PM	Self-directed learning	Obstetric and gynecology outpatients	All students: didactics ^b , case conferences, skills lab	Neurology outpatients	Psychiatry outpatients
Other	Three 5-hour shifts in the emergency department each month				

Note. Students spend a total of 3 weeks caring for inpatients: 1 week of internal medicine, 1 week of pediatrics, and 1 week of obstetrics and gynecology.

^aThe master clinician course consists of multispecialty case presentations by students.

^bDidactics includes lectures and case presentations.

dent and faculty satisfaction (average score, 4.6 on a 5-point scale). Low faculty turnover has resulted in an experienced cadre of clinical teachers who have refined their teaching and evaluation methods and have learned to allow students a great degree of responsibility in patient care.

Because the LIC curriculum involves less time in the hospital setting, some educators have questioned students' depth of medical knowledge and readiness for internships. However, we have reviewed 4 years of data for the Asheville LIC program—including results of "shelf exams" (National Board of Medical Examiners Subject Exams), scores on Step 2-CK (Clinical Knowledge) of the United States Medical Licensing Examination (USMLE), overall clinical grades, evaluations of students during their fourth-year acting internships, and follow-up interviews with graduates—and we have found no evidence that such concern is warranted. All of our students had higher USMLE scores on Step 2-CK than on Step 1, in some cases by more than 2 standard deviations (see Table 2); in addition, clinical grades, shelf exam scores, and evaluations of acting internships have been higher for the Asheville LIC cohort than for the third-year class as a whole. The clinical logs of Asheville students indicate that they have consistently completed a

higher percentage of their core clinical cases and procedures than have their peers in Chapel Hill, and almost all of the Asheville LIC students have matched in their first choice of residency. Finally, although influencing students' choice of specialty has not been a specific focus of the Asheville campus program, a higher percentage of these students (80%) have entered internal medicine, family medicine, pediatrics, or psychiatry.

Table 3 summarizes the unique aspects of the LIC model compared with traditional block rotations; these features allow the LIC model to address particular issues in the emerging health care system and to help students make informed career choices. Much of this flexibility comes from the unscheduled half-days and from focusing on more than one specialty at a time.

Given the successes of the Asheville LIC program, expansion from 10 students to 20 students is planned for the 2014–2015 academic year. In addition, 7 first-year students at the UNC School of Medicine were selected in January 2013 for the first class of the Sarah Graham Kenan Rural and Underserved Medical Scholars Program. As part of this experience, students will complete a 6-week summer internship in rural Western North Carolina between their first and second years. The students in this rural scholars program are automatically accepted into the Asheville LIC track. This innovative program is another example of the UNC School of Medicine's commitment to adapt its educational strategies to meet the changing health care needs of our state.

In summary, the Asheville campus of the UNC School of Medicine has developed a successful program utilizing an LIC curriculum. Academic evaluations have been positive, and preliminary results suggest that graduates are more patient-centered, more likely to see a broad range of conditions and procedures, better informed for career decisions, highly competitive for residencies, and more likely to pursue primary care or psychiatry. If possible, the LIC model should be expanded throughout the state to meet the needs of North Carolinians in the emerging health care system. NCMJ

TABLE 2.
Average Scores on Step 1 and Step 2-CK (Clinical Knowledge) of the USMLE for Third-Year Students on the Asheville Campus of the University of North Carolina School of Medicine

Year	Average score on Step 1	Average score on Step 2-CK
2009	216	248
2010	225	242
2011	232	246
2012	239	261

Note. USMLE, United States Medical Licensing Examination.

TABLE 3.
Comparison of the University of North Carolina School of Medicine Curricula: Traditional Block Rotations in Chapel Hill Versus the Longitudinal Integrated Clerkship (LIC) in Asheville

Parameter being compared	Traditional block rotations in Chapel Hill	LIC curriculum in Asheville
Learning focus	• Hospital-based • Specialty-centered	• Patient-centered • More team-based • Broader exposure to health systems
Continuity	• Minimal to none	• Continuity with patients and faculty • Continuity with other students in the LIC cohort • More patient ownership and greater autonomy
Feedback and evaluation	• Feedback is based on brief interactions during rounds or in conferences. • Minimal specificity or depth • Limited follow-up observations to evaluate improvement	• In-depth evaluations by faculty are based on frequent exposure and multiple aspects of care. • 3 comprehensive evaluations over 9 months allow for observation of improvement.
Perspective on chronic illness and mental health disorders	• Pessimistic or cynical view of chronic conditions: "Patients never get better."	• Students are able to observe real improvement in patients with chronic problems, particularly mental health problems. • More optimism
Cardiology, radiology, and emergency medicine	• Usually elective fourth-year rotations	• Required third-year rotations • Radiology and cardiology principles promote more rational and cost-effective ordering of tests. • Emergency medicine significantly increases exposure to urgent conditions and procedures.
Medical ethics and professionalism	• There is no formalized approach during the intensive and foundational exposure to clinical medicine in the third year. • Default or "hidden" curriculum is learned from the perspective of the stressful hospital residency environment.	• Ethics faculty members meet with students monthly to review actual cases identified in student logs. • Structured curriculum and informal discussions with clinical faculty improve depth of understanding and consistency of practice.
Career and specialty choice	• Choices are based on exposure to residents and rarely on in-depth exposure to non-core third-year clerkships.	• Choices are based on professional and personal experience with attending physicians, many of whom are in private practice. • Flexible schedules allow for half days with subspecialty or special-interest practices.
Exams and impact on learning	• Shelf exams are taken every 4–8 weeks; studying is exam-driven.	• Shelf exams are all at the end of the year; studying is patient-based. • Step 2 USMLE (2-CK and 2-CS) is taken immediately after the third year following the cluster of shelf exams. Little studying is needed, because all material is learned simultaneously rather than sequentially.

Note. USMLE, United States Medical Licensing Examination.
Shelf exams are National Board of Medical Examiners subject tests.

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