Ambulatory Family Practice Experience as The Primary and Integrating Clinical Concept in a Four-Year Undergraduate Curriculum

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The Upper Peninsula Medical Education Program seeks to graduate primary care physicians who will practice in rural, underserved areas. The program has a unique curriculum that involves four years away from Michigan State University's main campus and is based on ambulatory outpatient experience in a family practice model office. All basic and clinical sciences are learned in this setting. Novel ways of organizing faculty and student time help facilitate this plan. A thorough evaluation system helps monitor student progress. Preliminary results are promising indications that the program is meeting its goals.

Multiple lay and professional individuals are calling attention to the shortage of primary care providers and the maldistribution of these providers. Rural areas apparently have even greater difficulty attracting physicians who are comfortable and willing to practice in more remote locations. In a recent article, Smith et al[1] reviewed the many expressed opinions favoring family practice experience early in a medical student's education and detailed the case for community-based clinical education.

The purpose of this paper is to describe a unique four-year undergraduate medical curricular option of the College of Human Medicine at Michigan State University. This program seeks to exploit the many advantages of a community-based program cited by Smith: foster primary care as a career choice, develop interpersonal skills, and provide realistic office experience. This program—The Upper Peninsula Medical Education Program—hopes also to graduate physicians choosing both primary care as a career and a remote site as the eventual location of practice. What follows is a general program description and a specific description of the family practice input. Included is a discussion of general evaluation methods, program problems, and preliminary results.

General Program Description

The Upper Peninsula Medical Education Program (UPMEP) is a full four-year track of the College of Human Medicine at Michigan State Uni-

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versity. Based on a proposed system of modular education and health care,[2] the program was established in 1973. It will graduate its first ten medical doctors in spring 1978. All students are enrolled at Michigan State University and will receive the MD degree from that institution. Current enrollment includes ten sophomores and ten seniors, with plans for ten students at each level by 1981.

The UPMEP is an educational experiment designed to test whether changes in the milieu and style of medical education, as well as alterations in content, can influence the career choice and practice location of medical students. Specifically, UPMEP seeks to train competent primary care specialists who would practice comfortably in a rural, medically-underserved region such as Michigan's Upper Peninsula. The program seeks to foster self-assessment skills that will lead to a lifetime of self-remediation and continuing education.

Changes in curriculum, site of instruction, admission criteria, and evaluation methods have all been made to more fully realize the goals of the program. Student input figures prominently in planning and evaluation. The contributions of Upper Peninsula citizens to the design and implementation of the program derive from community advisory boards and a nonprofit corporation board of directors.

Faculty members come from the four-year colleges and universities located in the Upper Peninsula, as well as from Michigan State University's (MSU) main campus in the Lower Peninsula. Additionally, clinical faculty have been recruited from across the Upper Peninsula, Northern Wisconsin, and from MSU faculty. Two full-time family physicians form the core faculty for the clinical instruction. All faculty undergo joint review and appointment by the appropriate department of the College of Human Medicine and by Upper Peninsula administration and faculty.

Major curriculum innovations have been made, some in conjunction with the entire College of Human Medicine and others independently, to foster UPMEP goals. The curriculum can be conveniently divided into three phases, with Phases I and II constituting years 1 and 2, and Phase III, the last two years. All but the Phase I component (ten weeks) and some fourth-year electives are conducted in the Upper Peninsula, about 400 miles from campus. The principal clinical education unit is located in Escanaba, Michigan. A community of approximately 18,000 with about 25 physicians and a 125-bed hospital, Escanaba serves some 35,000 people in the area.

Phase I consists of an on-campus ten-week introduction to medicine, with exercises in first aid, problem solving, interviewing skills, and introductory courses in basic and behavioral sciences.

Phase II is a sequence of 13 Focal Problems. The focal problem is an integrated method of basic and behavioral science instruction which is grounded on clinically oriented paper cases. These cases provide the context and stimuli for the acquisition of basic factual material in a problem solving mode. This five-term sequence covers all concepts defined as pertinent by the various basic and behavioral science department faculties. Focal problems have been described in detail elsewhere;[3,4] they are learning packages based on 14 cardinal symptoms or signs, such as dyspnea, elevated blood urea, chest pain, or mental retardation. Using the problem as a take off point, the student learns all the relevant data from each of ten discipline areas, which include all the basic sciences, behavioral sciences, and clinical correlation. The student is guided in self-study by a concept list outlining the subjects to be mastered, a reference list keyed to the concepts, and study cases which highlight and integrate the data. Library and audiovisual resources provide the primary sources of didactic material. These are supplemented by group sessions with basic science faculty and clinical preceptors. This faculty is derived from local physicians and instructors at Upper Peninsula institutions of higher learning. Practical laboratory experience occurs in the classroom and local hospital. Also, an introductory anatomy prosection laboratory and a basic physiology course are part of *Phase I* on campus. Anatomy and physical diagnosis skills are taught in a clinical setting using paid models. Interviewing skills are also taught using simulated model patients, graduating to actual patient care encounters. This instruction is supplemented by community experience with resource agencies, actual patients with the conditions under study, and visits to community physicians' offices. Appropriate electives are encouraged. Between the second and third years, students take *Fundamentals of Patient Care,* a clerkship designed to introduce the

hospital as a health-care tool while demonstrating continuity and use of community resources.

Instead of the usual rotations through specialty clerkships in large hospitals that comprise the usual third and fourth year curricula of most institutions, *Phase III* consists of an integrated approach designed to reflect the outpatient, ambulatory, continuing contact model of practice that most primary care specialists provide. The curriculum consists of:

A. *Comprehensive Care Clerkship* (CCC) 36 weeks;
B. *Hospital Care Clerkship* (HCC) 12 weeks;
C. *Electives* 12-36 weeks (at least six weeks of electives must be in a tertiary care hospital).

The *Comprehensive Care Clerkship* is team taught by two family physicians and clinical coordinators in surgery, medicine, pediatrics, obstetrics-gynecology, psychiatry, and socioanthropology. CCC is based in the family practice setting (two to three half-days per week of clinic time) with supplementary experience in a community hospital, physicians' offices, and the Emergency Department. The coordinators capitalize on patient care encounters from these various settings to instruct the students.

The *Hospital Care Clerkship* is designed to expose the student to critically ill patients and complex management problems. A chance to work with subspecialists and to experience a large hospital is also involved.

Students are encouraged to choose electives that have high applicability to primary care, such as orthopedics, otolaryngology, and dermatology.

A sample representative schedule for a hypothetical student is shown in Figure 1. It is possible to meet all graduation requirements in $3\frac{1}{2}$ years, but most students choose to enroll for more than the minimum 12 weeks of electives.

The Ambulatory Clinical Setting

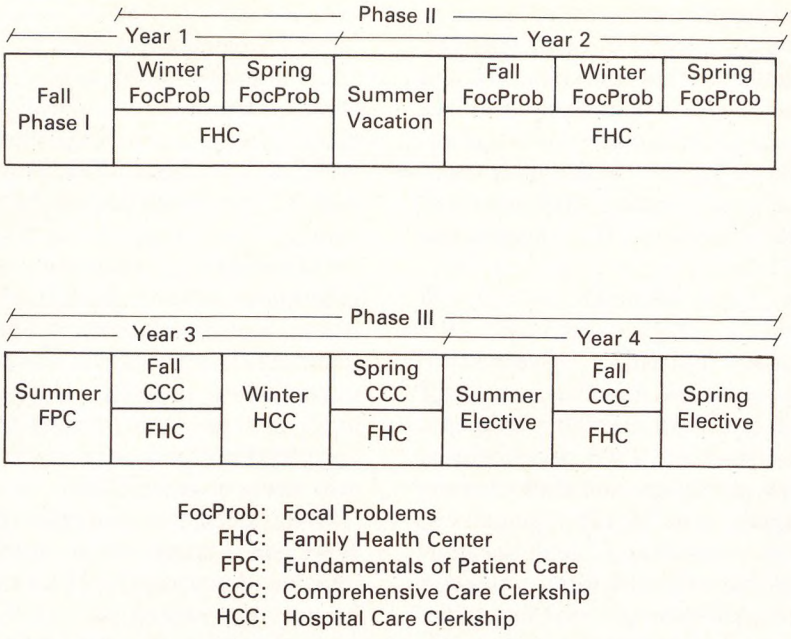
Supporting the entire curriculum as outlined is an ongoing, family practice-oriented, ambulatory experience in a program-operated and program-controlled model family practice center—The Bay de Noc Family Health Center (FHC). This center was established and staffed, and the patient care volume selected, specifically to support its use for undergraduate education. Two family physicians care for the 1,500 patients currently enrolled. Patients are accepted in the FHC with the stipulation that the entire family will enroll and that medical students be allowed to participate in their care. If these criteria are met, families are accepted on a "first-come" basis. The practice sees approximately 12 patients per six-hour patient-care day, leaving ample time for student instruction based on these patient visits. Future plans call for the addition of another physician, a family nurse clinician, and more patients. The practice attempts to model ideal practice conditions. Record keeping is completely problem oriented, and a diagnostic index is kept in the Pri-Care Code. An encounter analysis has been conducted. Record keeping is now being computerized.

Data show that the mix and type of patients represent a cross-section of the community, with all educational, age, occupational, and geographic groups represented adequately. The patients appear more than satisfied with their care. On a patient satisfaction survey, fully 87 percent stated that they have recommended the FHC to someone, and 93 percent feel that student involvement improves the patient's understanding of his problem.

A typical teaching day begins with hospital rounds to review and manage all patients being followed by students. Two 3-hour clinic sessions at the FHC fill the remainder of the day, punctuated by a midday, one-hour set of ambulatory "rounds" to discuss the FHC encounters of that day. Student assignment to the FHC is arranged so no more than two students are present at a time. This normally allows a one-to-one relationship with the preceptor; however, the ratio never exceeds one-to-two.

Student involvement in the Family Health Center begins with arrival in the Upper Peninsula at the start of Phase II, the second term of the freshman year (Figure 1). The Family Health Center exposure continues from this early point until graduation three years later. The time commitment to this office experience is as follows:

Phase II
(years 1 and 2)
Five terms
(12 weeks each,
60 weeks total)
one half-day every other week
(30 half-days)



FocProb: Focal Problems
FHC: Family Health Center
FPC: Fundamentals of Patient Care
CCC: Comprehensive Care Clerkship
HCC: Hospital Care Clerkship

Figure 1. Sample representative student schedule for four years in the Upper Peninsula Medical Education Program.

Phase III
(years 3 and 4)
Comprehensive Care Clerkship
(Three 12-week blocks,
36 weeks total)
one half-day, two to three times/week
(72 to 108 half-days)

Thus, over the $3\frac{1}{2}$ year curriculum, each student experiences between 100 and 140 half-day Family Health Center sessions, roughly 600 to 840 patient visits. In addition, any patient hospitalized from the Family Health Center is supervised by the involved student while in the hospital.

Phase II Use of the Family Health Center

The primary use of the Family Health Center in Phase II is to introduce the student to a family practice setting and to teach empathy, data gathering, physical examination, and medical record skills. The first term sees the student observing both the physician and the upper class, Phase-III students in patient care encounters. This is accomplished, at first, by assigning the student a "patient advocate" role. The student meets the patient in the waiting room, visits with the patient until both are called by the nurse, observes the nurse check the patient in, and observes the interaction with the provider, either the upperclassman or the physician. On other occasions, the student may answer the telephone, accompany the nurse, or assist the receptionist. In each circumstance, the student is asked to assume the patient's identity and write a report of the activity as the patient may have seen it.

As the student progresses, he/she is allowed to perform gradually larger segments of the physical examination, so that by the end of the first year of training, he is able to handle himself well with patients and perform a focused examination on any system. During this first year the student also learns interviewing skills through a Patient Interaction Course using model patients. The first year allows a graded exposure to patient contact skills and physician skills in an actual practice setting. However, the student is never expected to do "physical diagnosis" or attempt to solve problems for which he has no training. Each student has

ample opportunity to "debrief" his encounters with the physician and to participate in group discussion at Family Health Center rounds. The student hands in a note on each observed visit; the note is problem oriented and is reviewed by the physician.

At the beginning of year two, the student is ready to begin a continuity experience. Each student is assigned 15 or more families that will form his/her "panel" until the student graduates. When a member of his panel makes an appointment or is hospitalized, the student is required to be involved and is excused from other activities to do so. In addition to panel members, additional patient contacts are assigned to assure that the student follows two pregnancies and sees children of all ages during this second year of medical school. As the student's skills increase, he is allowed correspondingly greater responsibility for each encounter. By the end of the second year, each student handles the entire history, physical examination, and problem formulation, and assists in developing the management plan and in providing patient education. Each encounter is written in problem-oriented medical record (POMR) format and, after physician review, becomes part of the permanent office chart.

Phase III Use of the Family Health Center

It is in Phase III, the traditional clinical years, that the family practice orientation assumes its greatest importance. Instead of separate rotations in the basic clinical disciplines, an integrated clerkship covers all of these, along with family practice and a Social Context of Medicine component. This is called the Comprehensive Care Clerkship (CCC) and is organized into three separate 12-week blocks for any one student. Between these blocks are electives and time for a 12-week Hospital Care Clerkship (Figure 1).

The Comprehensive Care Clerkship takes its objectives primarily from those common objectives listed by each of the component clinical departments. The clerkship is taught by two family physicians, a sociologist, and a coordinator for each of the major clinical disciplines. The major source of patient contact continues to be the Family Health Center. This source is supplemented by Emergency Room and inpatient hospital encounters.

The Phase III students form small groups of three to four members each who assume responsibility for the family panels of each member. Thus, one group may care for 50 to 75 families. Student schedules are adjusted so that one group member is always assigned to the FHC to "cover" for the group. This models the coverage arrangements of a group practice. Each student rotates call with one of the physicians each night. In CCC, the student becomes the primary care provider, always seeing the patient first to make an assessment and plan. This is then reviewed with one of the family physicians or a coordinator. The preceptor may check or support the student's findings and help the student understand pathophysiology and management.

Clinical Coordinator Role

The role of the clinical coordinator is the key to this integrated curriculum. This role involves five key components:

1. Instructor of and advocate for each respective discipline (such as pediatrics, surgery, etc);
2. Evaluator of student progress;
3. Student advisor and counselor;
4. Planner and evaluator of the overall curriculum and program; and
5. Liaison between the appropriate MSU campus department and the UPMEP.

Each coordinator spends a minimum of one day per week fulfilling one or more components of this role. These coordinators are mostly community physicians who are reviewed by the respective campus departments and remunerated for their time. Each coordinator spends at least two full days per month instructing students. Daily input occurs from the family physicians in the context of hospital rounds and FHC patient care. Specialty input comes from periodic instruction by the coordinator, who uses index cases from the FHC to teach the details of discipline-oriented objectives. These coordinators often serve as preceptors for Phase II focal problems or as resource persons for community physicians.

Evaluation

Students in the Upper Peninsula Program must meet the same graduation requirements as students in the regular program of the College of Human Medicine. The system used to evaluate the per-

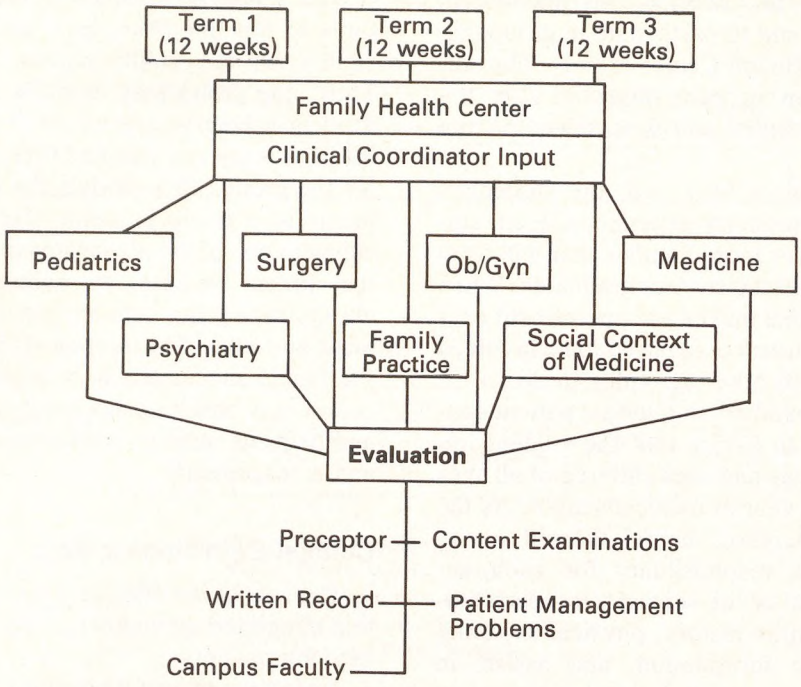


Figure 2. Components and evaluation of the Comprehensive Care Clerkship.

formance of students is, for the most part, the same as the system used for students in the regular program.

Evaluation, as outlined in Figure 2, is thorough, ongoing, and comprehensive, involving multiple components:

1. *Preceptor Evaluation:* At least once every 10 to 12 weeks, and in many courses every month, preceptors rate students on a set of criteria which seeks feedback on relationships of students to patients, staff, and colleagues; student responsibility and self-evaluation skills; knowledge of facts and concepts; manual skills; student perspectives about comprehensive care; skills of data gathering, problem formulation, and management; and student skills in record keeping. A strengths-and-weaknesses inventory plus recommendations for changes are sought from each preceptor. This information is discussed in faculty sessions and with the individual student. Preceptor evaluations have been consistently positive in all the above areas.

2. *Written Record Review:* Students must submit written records on patient care encounters on a regular basis. These records are read critically and returned to the student. These records also serve as the basis for group learning sessions, as students share their findings and subsequent readings with student colleagues and preceptors.

3. *Content Examinations:* At the end of each focal problem and at the end of each term of clinical work, students write comprehensive content examinations which are designed to test student knowledge in the areas delineated by statements of objectives. The focal problem tests contain questions from each of the basic sciences, behavioral sciences, and clinical correlation items. The clinical tests cover each of the major specialty areas, including family medicine, internal medicine, surgery, pediatrics, obstetrics-gynecology, psychiatry, and the social context of medicine. Test items are generated from item pools on campus and augmented by items written by students and preceptors in the Upper Peninsula. The results have shown Upper Peninsula students to be the equal of campus counterparts on these content evaluations.

4. *Patient Management Problems:* At the end of each focal problem and once each term during the clinical years, each student writes a patient management problem. The focal problem examination is an essay test designed to test problem-formulation and management skills. The tests used during the clinical years are the "latent image" variety and test the student's problem-formulation skills in a setting that provides data in increments and provides a stable format that is repeatable. Upper Peninsula students have consistently done well on these problems, matching or exceeding the performance of campus students.

5. *Campus Faculty Evaluation:* Departmental faculty members from campus travel to the Upper Peninsula each term to teach and evaluate student performance. Several departments (medicine, pediatrics, and obstetrics) include these evaluations as part of the student's final status report. A recent term's analysis demonstrated some 42 hours of campus faculty time spent in the Upper Peninsula. These evaluations take many forms including oral examinations, observation of student data gathering and interviews, review of student records and logs, and general program critique. The written reports of these visitors have been positive and indicate that Upper Peninsula students perform comparably to campus-based students. Also evident is a general tone of support for the Upper Peninsula Program as a concept by means of which experimental and innovative ideas can be tested. When problems have been identified, campus faculty input has facilitated the solutions.

Thus, any one curricular component and its respective preceptor usually have information from at least four of the above five evaluation components to assess student progress at the end of each 12-week block. Some 25 to 35 separate evaluations influence the final pass-no grade option at term's end. By the end of the 36-week Comprehensive Care Clerkship, for example, 85 to 100 separate inputs have been used to evaluate each student.

The College of Human Medicine has not required its students to take National Board Examinations, neither Parts I or II. The Upper Peninsula Program has likewise not required these tests. The first full, outside, standardized evaluation will occur when the current senior class takes the Federation Licensing Examination (FLEX) in spring 1978. Since past performance of Michigan State University students on the FLEX has been good, and since Upper Peninsula students have matched the MSU campus students in all other areas, it is anticipated that the Upper Peninsula graduates will do well on the FLEX.

Spring 1978 also presents a second opportunity for outside evaluation; the College of Human Medicine will undergo the national accreditation review by the Liaison Committee on Medical Education. This review will include the Upper Peninsula Program. Preparation for this review includes the usual self-study and will also include a preliminary review of student performance by a panel of experts selected from medical education settings other than Michigan State University. This should provide the program useful comparative data for evaluation and program review.

The opinions and feedback of students are sought each term to evaluate the program, the curriculum components, and the faculty. Student involvement has been intensive in all areas of planning and implementation, so the feedback is informed and is used to make needed changes. Students are very satisfied with the integrated curriculum and the early and comprehensive involvement in patient care. Students are overwhelmingly positive about the faculty, its quality, commitment, and availability. Areas of student discontent have centered on the lack of classmates to compare with themselves; long distances and prolonged periods of separation from family have been problematical. Financial stresses have been constant. Students also have many, or all, of the usual student concerns about their own competence, the adequacy of the medical problems seen, and the multiple and frequent evaluations they must face. Overall, high morale among the students and a sense of contribution to an important pioneering effort are prevailing feelings.

Problem Areas

Problems have occurred during the planning and implementation of this curriculum. A key problem has been one of convincing faculty and students alike that a nonclerkship, ambulatory, outpatient curriculum can cover the objectives of an entire medical school training program. Another difficulty has been the amount of coordination and communication needed to keep both

faculty and students abreast of program activities and curriculum development. This has been especially troublesome since the curriculum evolved even as it was being implemented, thus causing unexpected adjustments for the participants. Development of the evaluation system has been difficult and still is not fully satisfactory. At present, evaluation consists of multiple pieces taken from other settings and is used to assess the integrated curriculum. A more comprehensive evaluation system, functioning in a continuing rather than episodic fashion and keyed to the program's expressed goals, needs to be developed.

The doubters have decreased as the first class nears graduation. Evaluations by program and campus faculty and by examinations show the UPMEP students to be as well prepared as senior students from other campuses of the Michigan State University system. Regular exchange with campus departmental faculty and the Dean's office helps assure curricular and student review, prevents professional isolation of the UPMEP faculty, and communicates mutual goals and concerns. Administration of the curriculum is now handled by a family physician in the FHC where the actual instruction occurs. Two administrative assistants greatly aid coordination. Communication is further advanced by a weekly newsletter. At the end of each term all faculty and representatives of the students meet to evaluate and plan the program. The evaluation system has used components from campus and program faculty and continues to be refined each term.

Discussion

As stated, the Upper Peninsula Medical Education Program has the overall goal of educating primary care physicians who will elect to locate in rural, underserved areas such as Michigan's Upper Peninsula. These physicians would carry with them the basic skills, values, and attitudes that constitute the "generic" physician. Final results cannot be tabulated until the initial graduates complete postgraduate study and enter practice. However, as the first class applies for its residency and internship choices, preliminary results can be listed. Of the ten seniors, all are planning practice in a rural area, and seven specify the Upper Peninsula. The career choices are heavily weighted toward primary care: four family physicians, one internist, one pediatrician, and one obstetrician-gynecologist. One student remains undecided, interested in both surgery and family practice. The remaining two have chosen radiology and physical medicine.

Many other positive results are evident. The students receive exposure to continuity of care lasting three to four years. Early presentation of the undifferentiated symptom in the office setting, following the patient, and helping to make the decision on when and why to hospitalize are regular occurrences for the student. Students have followed families from the time pregnancy was diagnosed, through delivery, postnatal care, and well-baby care. Counseling for marital, family, and child-rearing problems occurs often with students. Exposure to multiple community models of the practicing primary physician is a strong asset of the locale. Community physicians have been selected and developed as faculty members, teaming with their university counterparts to plan and evaluate program and curriculum and to instruct the students. Program faculty assisted the community in developing continuing medical education and patient education services.

An optimistic appraisal of the results seem appropriate, even at this early date. Even if the current heavy commitment of the first graduates to primary care and rural practice is eroded by postgraduate exposures, the program has had significant experience and success with defining an alternative curriculum that can function away from a large university setting, and pioneering work has been done in defining the ambulatory nature of the curriculum over a full four-year program.

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