

11/16/98 DRAFT

**PATIENT-DOCTOR II: A MULTIDISCIPLINARY MEDICAL SCHOOL
COURSE AT UNIVERSITY OF CALIFORNIA, IRVINE**

Brian S. Andrews M.B., M.D. and Johanna Shapiro, Ph.D.

ABSTRACT

A unique multidisciplinary second year medical school course, Patient-Doctor II (PD II), was established at the University of California Irvine, incorporating both clinical and non-clinical disciplines. The impetus for this course stemmed from student and faculty dissatisfaction with many isolated courses that were predominantly lecture based. The changes that have been effected include i) integration of these multiple courses into a coherent single course, ii) integration of the major basic sciences (biochemistry, pathology and pharmacology) within the course structure, iii) replacement of many formal lectures by small group discussions and peer-driven learning, with exploratory learning guided by defined objectives, iv) increased participation by students in the planning of changes in the course and v) changes in the way history taking, physical examination and clinical reasoning were taught. Since the development of PD II, there has been a marked improvement in student and faculty satisfaction, as well as a progressive increase in the scores for the USMLE (part I).

INTRODUCTION

In the Summer of 1993, the University of California, Irvine (UCI) embarked on a significant restructuring of all four years of the medical school curriculum, with special attention to the pre-clinical years. The reasons for the change were multiple, but included:

i) changing national trends in medical education (), such as the incorporation of innovative educational theories and methods, and

ii) dissatisfaction of students and faculty with the traditional lecture based curriculum, a point reflected by an L.C.M.E. review in 1992.

While there had been several earlier attempts to initiate major curricular reform at UCI, most had no impact on reforming an entrenched traditional medical curriculum. However, in 1993, the above pressures resulted in the hiring of a new Senior Associate Dean for Medical Education and the formation of a Blue Ribbon Committee to review the medical school curriculum. This report focuses on the changes implemented in the second year of training.

Specific recommendations of the Blue Ribbon Committee regarding the second year curriculum included:

i) integration of basic, clinical and social sciences with history taking and physical diagnosis,

ii) introduction of clinical problem solving,

iii) fostering of inter-disciplinary collaboration between faculty members, to stimulate research and teaching interactions, to reduce the amount of duplicated course material, and to maintain quality control of teaching,

iv) incorporation of additional educational theories and methods, such as problem-based learning (PBL),

- v) identification and development of a core body of knowledge for each course component,
- vi) coordination of previously isolated courses, e.g. bioethics and behavioral sciences, into a single multidisciplinary course and,
- vii) introduction of new curricular subject matter, such as medical economics and medical informatics.

BACKGROUND AND SIGNIFICANCE

The last decade has seen a remarkable flurry of activity in the area of medical education curricular reform. External stimuli for change have included major foundation and organizational reports such as the GPEP, the Macy Foundation Report, and the ACME-TRI (Swanson & Anderson); new LCME accreditation standards requiring evidence of centralized authority and resources specific to medical education (Swanson & Anderson); public concern over rising medical costs and the desire to train physicians in a cost-effective manner (Boelen); and the explosion of biomedical knowledge, particularly in molecular and cell biology, immunology, and genetics (Petersdorf). Powerful internal forces, primarily student and, to a lesser extent, faculty dissatisfaction, have also promoted curricular change (Swanson & Anderson; Hendricson).

Curricular change can be far-reaching and paradigmatic (Their), but is more often piecemeal, leaving the basic institutional culture intact, while introducing specific, identifiable technological or modernizing modifications in the curriculum (Hendricson). Numerous authors note that some form of curricular change is now widespread among American medical schools. Most commonly listed types of reform are the development of interdisciplinary courses, the integration of basic and clinical sciences, an emphasis on a grasp of concepts rather than memorized facts, the incorporation of social and behavioral aspects of health and disease (Cohen), including both doctor-patient (1:1) and population-based medicine (1:n) (Greenlick), fewer lectures, more small groups, more active learning experiences, and an emphasis on independent learning (Mann, Jonas).

The innovative educational methodology that has probably received the most attention is problem-based learning (PBL), which has been in existence over thirty years in Canada, and almost seventeen years in the U.S. In the pre-clinical years, PBL is utilized in some form in 100 accredited U.S. medical schools. PBL has been described as

a somewhat “anarchic alternative” to conventional learning approaches (David), and uses small group discussion, contextual learning, integration of knowledge and emphasis on patient problems to create a student-oriented learning environment (Dolmans/Schmidt). There is evidence that in comparison to conventional curricula learners, PBL students have better independent learning skills (Friedman, Dolmans/Schmidt); greater ability to integrate basic and clinic sciences (Friedman, Petersdorf); increased retention of knowledge, and easier retrieval of information (Mann); enhanced motivation for learning (Friedman, Dolmans/Schmidt); better performance on certain clinical parameters (Schmidt; Somylo); increased use of library resources (Dolmans/Schmidt; Blosser); improved reasoning and mastery of general principles (Vernon); improved interpersonal skills (Somlyo; Moore).

The UCI Patient-Doctor II course was modeled after the UCLA Doctoring course (Wilkes), and faculty from that course served as consultants to the development process of PDII. The Doctoring course extends vertically across all four years of the curriculum (as does the PD series at UCI). Its stated goal is to help physicians to see patients as people rather than as “organisms with disease.” It incorporates communications skills, disease prevention and health promotion, patient education, evidence-based medicine, and ethical legal, cultural, psychological and economic public health issues that affect health care. The Doctoring course involved the merger of many social medicine “orphan” courses, such as ethics, toxicology, and medical economics. It uses PBL in eight four-week modules over the course of a year, based on an actual patient case reproduced through a standardized patient, a videotape presentation, or a paper case. The format also employs two faculty tutors, one M.D. generalist, and one mental health professional or social scientist. Students interview the patient and formulate learning objectives. The course includes a protected half-day for independent study, consultation opportunities with faculty experts, clinical epidemiology problem sets, and a final session that integrates learning and applies it to the patient situation.

A similar, but less ambitious first-year course consisting of 5 modules of one-week duration each has also been described (Dietrich). In this format, ten students are paired with one family physician preceptor. The course employs a combination of small groups and lectures that are used to provide foundational knowledge and introduce key concepts. This course also uses group meetings without the faculty tutor present to refine and modify learning tasks. Focusing on physical examination, an innovative program using active-learning approaches to teach skills of physical examination, communication and diagnostic reasoning has also been described (Curry). This course had as its goal to go beyond the mechanistic, protocol-driven process of most Introduction to Clinical Medicine courses whose limited, history-based communication skills marginalize exploration of psychosocial issues and health promotion. This course begins in Year 1 and extends into the second year, “paralleling” a year long Patient, Physician, & Society course which addresses both doctor-patient relationship issues and physician responsibilities to society. The physical examination and diagnosis component uses a PBL-influenced approach, in which clinical encounters with hospitalized patients determine learning issues for the next encounter.

While the UCLA Doctoring course includes a half-day in clinical settings to develop interviewing skills and acquire physical diagnosis skills, to our knowledge neither this nor any other “doctoring” course has attempted a major curricular revision which includes history taking and physical examination closely coordinated with both the module content and defined clinical disorders. We will now describe the Patient-Doctor II course at UC Irvine, its innovations and the difficulty in their implementation.

METHODS

COURSE DEVELOPMENT

For 18 months prior to the implementation of the PD II course, regular monthly meetings took place under the guidance of the Associate Dean for Medical Education to plan the basic course structure and content. Participants included the Directors of the smaller courses (behavioral sciences, epidemiology and biostatistics, human sexuality, bioethics, nutrition), the major basic science courses (anatomy, physiology, biochemistry, pathology, pharmacology, microbiology), Examination of the Patient and History Taking, Mechanisms of Disease and the Clinical Clerkships (Medicine, Surgery, Obstetrics and Gynecology, Pediatrics and Psychiatry). During these sessions, faculty from each learning area determined the knowledge, attitudes, and skills medical students should be required to master. At the end of this period, it was decided for pragmatic reasons, including the success of the UCLA Doctoring Course and LCME mandates for quick curricular reform, to implement the course without any pilot testing.

Course Structure and Content: The nine month course was divided into eight components, called modules, usually lasting for a period of one month. Each module was organized around a clinical problem involving a specific organ system or discipline (cardiac, respiratory, gastrointestinal, neurology, psychiatry, geriatrics, pediatrics, obstetrics and gynecology). A basic clinical history was generated for each of the modules by the physician course director for PDII. The small course directors were asked to develop a core basic curriculum and modify the clinical history and physical findings for each case scenario in order to incorporate specific “learning objectives” reflective of their overall course goals and objectives.

The educational methodology utilized relied primarily on small group discussion incorporating problem-based techniques to interview patients and establish learning objectives. However, in a departure from traditional PBL approaches, the use of module-

specific learning objectives previously defined by small course directors for each learning area enhanced the standardization of learning across groups.

A half-day faculty development workshop, led by faculty from the University of New Mexico, preceded the introductory year of PDII. Subsequently, the co-directors provided a 2-hour mandatory faculty training session for all new PDII faculty. Returning faculty were encouraged to attend. Attempts were made to have a required meeting for all co-leaders once a month to discuss problems in teaching and course coordination.

COURSE PARTICIPANTS

Administrative roles: Overall responsibility for course development, implementation, and supervision belonged to the course co-directors, a physician rheumatologist from the Department of Medicine, and a psychologist/ethicist from the Department of Family Medicine. The course co-directors were chosen by the Associate Dean for Medical Education with the approval of the organizing committee. A half-time staff coordinator based in the Office of Medical Education was responsible for day-to-day course operations.

Course advisors and consultants: Course advisors (the former small course directors) developed comprehensive and specific overall course objectives in their particular area of expertise, developed relevant learning objectives for each module, and reviewed each case to ensure adequate content material. In addition, all faculty involved in the second year curriculum, as well as medical specialties that had formerly participated in the History, Physical Examination and Diagnosis course (i.e., Anesthesiology, ENT, Neurology, Ob/Gyn, Ophthalmology, Orthopedics, Pediatrics, and Surgery) participated in organizational meetings as PD II course consultants.

Co-Leaders: Each student group was directed by two faculty co-leaders, a practicing physician and a non-physician, such as a basic scientist, social scientist, ethicist, psychologist or nurse practitioner who remained with the same student group for the

entire academic year to provide continuity. The role of the co-leader was to focus and direct patient interviewing and group discussion.

Experts: Experts were faculty members or community professionals who had knowledge and skills relevant to specific learning objectives in the module (i.e., ethics, human sexuality, toxicology, etc.). It was the responsibility of Course Advisors to identify an Expert for each module. Experts provided a mini-lecture on material relevant to that module's learning objectives to a group comprised of one student from each learning group, then answered questions and facilitated a discussion of the learning objectives (Fig.).

Preceptors: Preceptors were drawn from either full-time or volunteer faculty who worked with small student groups during physical examination sessions. Their role was to teach and supervise various aspects of physical examination.

Surrogate patient: The module was introduced by a surrogate patient who for the first three years of the course was either an unpaid faculty member, an internal medicine resident or a university staff member depending on the age, sex and ethnicity of the patient involved. Surrogate for each of the eight student groups were provided with a script detailing both physical (and psychological, if any) complaints, and were rehearsed for 30 minutes by the non-physician course director prior to the patient interview.

Students: The second year class was divided into groups of eight students that were maintained throughout the entire second year. Students were randomly allocated to groups based on grade point average, gender and race/ethnicity. Over the course of the academic year, each student in the group took a full history from a surrogate patient with the aims being to write up a detailed clinical history and present orally a succinct summary of the clinical problem.

SURROGATE PATIENT INTERVIEW

In the initial session of the module, one student volunteered to be the Interviewing Student, to obtain the full history from the surrogate patient. Students were expected to improve their interviewing and history taking skills while eliciting predefined patient problems and general learning objectives. One student recorded the history on a board, another student generated learning objectives derived from the history, while the remaining students documented additional elements of the history and learning objectives. To maintain the focus of the interview, either the Interviewing Student or a faculty Co-Leader could call a time-out to redirect the interview and help the student with interview techniques. The Interviewing Student's performance was then critiqued by the other students, co-leaders, and the surrogate. Next students reviewed and allocated among themselves both the course-defined learning objectives and those generated from the history. Examples of course-defined learning objectives are listed (Table). Results of physical findings and pertinent laboratory results were then provided to the students, to be used in writing up the history, physical and discussion of patient management, which were reviewed subsequently by the physician Co-Leader.

INDEPENDENT STUDY TIME

After the interview, in weeks one and two, students had protected independent study time, consisting of two three-hour blocs. The purpose of this activity was to explore their assigned learning objectives. This component of the course was closely linked to information management instruction.

INFORMATION MANAGEMENT INSTRUCTION

Students were scheduled to meet at regular intervals with librarians who provided an overview of resources used to search the medical literature throughout the PDII modules, and to focus on specific learning objectives from each module. This training included a demonstration of the on-line catalogs and database systems, literature searching critical appraisal skills, and Internet applications (Minchow, 1996).

EXPERT SESSION

Students from each small group who were responsible for learning objectives in a specific area (e.g., behavioral sciences, ethics, toxicology) (see Fig.) met with a faculty or community Expert for a required three hour period. The Expert reviewed the specific learning objectives with the students, provided basic information in a mini-lecture format, corrected misconceptions, and directed them to additional information.

RAP SESSION

Following the Expert session, the original group of students met without faculty to review the information they had generated on each of the specific learning objectives. The goal of this session was to promote peer-driven learning. Students then summarized in written form the information generated about each of their learning objectives. These assignments addressing the learning objectives were turned in during the Final Session and forwarded to the relevant Expert for graded critique and written comments.

FINAL SESSION

The goals of this session were to train students to: 1) write a detailed patient history, 2) present a succinct oral summary of the case, 3) review the learning objectives, and 4) apply the information acquired to develop a management plan for the patient. Each student brought a detailed write-up of the patient's history and physical examination, together with analysis of laboratory results, provisional and differential diagnoses, and a management plan. One student made a brief oral presentation of the history, which was critiqued by the group. Students then randomly selected and responded to questions about one of the learning objectives they had not specifically researched. Finally, the Interviewing Student re-interviewed one of the Co-Leaders who, acting as the "surrogate patient," asked specific questions regarding diagnosis, management, and prognosis. Case write-ups and Learning Objectives were evaluated respectively by the physician Co-Leader and the designated Expert. The graded materials were returned to the students within 10 days.

Physical Diagnosis and History Taking: At the start of each module, a subspecialty faculty demonstrated history taking and specific aspects of the physical examination for the specific organ system under study in front of the entire class.

During the second week, students were divided into groups of four and spent two hours with a physician preceptor performing an organ specific examination on normal individuals {students did not like examining each other}. In the third week, each of the student groups with their physician preceptor, rotated among and examined patients with defined physical findings within the organ system (see Table Z) {this was an attempt to ensure students had seen patients with basic defined problems before they finished their student training}. The four students spent 20 minutes with each of six patients {concern about the limited exposure, quality control}. Students were expected to prepare for the sessions by reading assigned portions of the physical diagnosis text. In addition to performing examinations within each of the eight major areas documented in Table Z, larger student groups also rotated through ENT and Ophthalmology. Dermatology was carried out in the Mechanisms of Disease Course in the latter half of the 2nd year. In the Adolescent module (Table Z), students participated in a Pelvic Workshop where they performed pelvic and breast examinations.

Complete History and Physical Examinations were performed during the last three months of the course. Pairs of medical students examined patients on the wards at UCIMC and the Long Beach VA Medical Center, observed by senior medical residents. Each student wrote up two H&Ps with management plans which were reviewed and graded by the medical resident {problems were availability of preceptors to carry out this role in a Managed Care environment}.

Evaluation: Students evaluated all aspects of the course and modules, including the faculty. Students were evaluated quarterly by their Co-Leaders on interviewing skills, the evolution of their knowledge data base and clinical problem-solving skills. Students were assessed after physical examination sessions by their preceptor regarding basic knowledge and preparation, developing clinical skills, patient rapport and group dynamics. Students also received written comments and evaluative scores on their case-write-ups and learning assignments. Three multiple choice examinations based on USMLE format were given. The course also experimented with quizzes after each module {these were ultimately abandoned}. In the first year, the course was graded Pass/Fail within a standard letter grade system. In the subsequent two years the entire grading system for the College of Medicine changed to Honors/Pass/Fail, including the PD II Course.

RESULTS

COURSE DEVELOPMENT

Integration of many second year courses into an extremely complex course required strong administrative leadership by the course co-directors and considerable trust by the faculty towards the co-directors and the Associate Dean. Faculty who previously ran their own courses relinquished both control and autonomy.

Some subject matter (Toxicology, Biostatistics, Epidemiology) was more difficult to integrate than others, in part due to the considerable difficulty adapting the way in which their course material was taught to conform to the modular, patient-oriented structure of PDII.

The absence of any pilot-testing of the course had both positive and negative consequences. Due to the magnitude of the changes, the course was critically scrutinized by all. PDII was viewed as a swift and dramatic response to student curricular concerns, but when problems occurred, they were amplified but readily rectified.

The coordination necessary for the course to function was overwhelming, requiring two co-course directors, an administrative coordinator and a half-time secretary, six course advisors, 24 co-leaders, 24 preceptors, and 25 experts/lecturers. Paperwork generated by the course was staggering, in particular getting case write-ups and learning objectives to appropriate faculty. Difficulty in faculty meeting course deadlines for returning evaluated materials and last-minute cancellations by co-leaders, preceptors, and surrogate and real patients further added to the difficulties. A major improvement introduced in the third year of the course was direct e-mail linkage between students, faculty and administrative staff. This provided ease of scheduling, grading and transmission of cases and learning objectives, as well as immediate expression of student concerns with prompt feedback by administration and faculty. The only difficulty encountered was with faculty not conversant with technology.

As the course was designed to be inclusionary of all faculty, every effort made to involve faculty from diverse academic backgrounds, including basic and clinical sciences, social sciences, nursing and the clergy, all bringing different life and professional perspectives to the course.

Faculty recruitment was difficult due to significant time commitments and lack of reimbursement, especially for physician faculty with the result that ideal, rigorous standards were difficult to enforce.

Faculty had several concerns, most notably the responsibility given to the student in the learning process and the loss of faculty autonomy. While specialist physicians may occasionally have felt uncomfortable about their knowledge base in general internal medicine, basic scientists also felt that their expertise had no relevance to the content of the module. Especially in the early stages, many basic science faculty were uncomfortable with their co-leader role and felt redundant, adding little to the group dynamics. In time they became aware of their valuable role, especially when the physician co-leader did not attend and they were forced, and able, to lead the group. Successful basic scientists were those who felt most comfortable in representing an educated lay-person's view in raising issues of concern to patients.

Another problem was lack of awareness by faculty of students with learning disabilities and psychiatric problems. For reasons of confidentiality, such issues were never brought to the attention of co-leaders, but inevitably the consequences of such difficulties surfaced over the course of the year.

The annual faculty development workshop at the start of the course helped orient faculty, but did not adequately prepare them for their new roles as co-leaders and experts. Due to time limitations, the scope of the mandatory faculty workshop focused more on the complex nature of the course, rather than on the individual teaching skills. Further, the monthly co-leader sessions were poorly attended, especially by those who would have benefited the most. Of all faculty roles, co-leaders were the most highly evaluated by students who admired and respected both the physician and non-physician faculty. However, some used to a didactic teaching had difficulties adapting to the group approach and learning to leave many responsibilities to the students for their own learning. Attendance at co-leader sessions was 100%. Occasionally, the physician co-leader dominated group discussion and treated the non-physician as an ancillary participant.

Faculty experts, while invaluable, had difficulty comprehending the course due to their lack of continuity in the course. One dilemma we faced was whether a single person could be an expert for the entire content area or whether a group of experts was needed. In general, we utilized individuals specializing in specific content areas. As a result, the individual expert provided the most current and in depth information, although when one person was responsible for the entire content area, the course flowed more smoothly, but with less specific expertise.

With respect to teaching physical diagnosis, subspecialist clinical preceptors could not replace a well trained general internist in broadly teaching all areas of physical diagnosis. Further, a single physician assigned to a physical diagnosis group for the year was better able to assess student progress in knowledge and skill.

In the first year of the course, students were very supportive and enthusiastic. Students made many suggestions to modify the course and the co-directors acquiesced readily as all involved were exploring the appropriate structure and content of the course. In subsequent years when the format became more stable and Honors-Pass-Fail grading was introduced, the novelty wore off. The course then became just another academic hurdle, with students again focused on their grades.

One issue that arose early in PDII was whether students should rotate among co-leaders. This idea was promulgated by students, in part to increase exposure to different clinical perspectives, and in part out of fear that some students had "easier" co-leaders, that some faculty were more "competent" and that some faculty were more aware of student problems. The course co-directors decided on group stability, with students remaining with their co-leaders for the entire year, favoring continuity and relationship-building.

While students enjoyed the interview process which they rated as the most successful aspect of the course, surrogate patients exhibited variability in credibility and accuracy of symptom and history presentation. When the course received significant financial support, surrogate patients were replaced by paid, well trained standardized patients who were more reliable, consistent and convincing in their histories.

Learning Objectives: The development of learning objectives, both for the overall course, and for each module, proved difficult. In terms of overall objectives, there was an initial tendency for former small course directors to cram all course objectives into PDII. As reform spread both horizontally and vertically throughout the curriculum, this problem was alleviated by redistributing many of these objectives to other courses both in the second year and other years.

The most significant difficulty in creating modular learning objectives had to do with adequately tying the objectives to the case at hand. This was probably the result of different individuals writing the case and creating the learning objectives. Learning objectives provided by faculty were also criticized as being too vague and imprecise: students were often unclear how to satisfy them. All attempts on the part of faculty, including evaluation of student oral presentations and written responses, to actually assess student mastery of learning objectives met with considerable student resistance. Students continued to feel that the extent and depth of knowledge they were supposed to acquire through their independent research, assigned reading, and attendance at expert sessions remained insufficiently specified.

One modification that considerably reduced student anxiety about the learning objectives was the development of “key concepts,” or a brief synopsis written by faculty identifying and defining all the important terms and constructs to be mastered within a given module. Further modifications included the eventual elimination of student written responses, as well as **OTHER CHANGES?**

Independent Study.

Expert Panels: (Method: The first attempt to expose students to expert opinions was structured in a panel format, with a row of experts discussing various points of the case and learning objectives in front of the entire class). Unfortunately, the Expert Panels proved unsuccessful, as there were too many experts (often as many as 10); the experts would not interact amongst themselves; and they tended not to discuss the case but give mini-lectures. For their part, as with most large lectures, many students did not attend and those who did, despite considerable prompting from course directors that included requiring one student in each group to be prepared to ask a question of panelists, tended not to interact with panel members.

Expert Sessions.

Rap Session:

History Taking and Physical Diagnosis: One major difficulty was training students using outpatient volunteers drawn from a managed care environment.

Using outpatients led to a paucity of exposure to more severely ill patients.

We also discovered that many students, particularly those originally from Middle Eastern and Asian countries, felt extremely uncomfortable during the partnered normal physical examination.

Final Session:

EVALUATION - In its first year as a Pass/Fail course, PDII was able to eliminate much of the desperate obsession with grades that characterizes the focus of students

in graded medical schools. Unfortunately, as the only non-graded required course in a highly demanding curriculum, PDII was unable to compete with the graded courses. This was reflected particularly in poor attendance at expert panels and lectures.

After its first year as a Pass/Fail course, the PDII evaluation mechanisms engendered much frustration and anger in students. As noted above, multiple forms of evaluation were used, including subjective evaluation of clinically-related skills by experienced co-leaders and preceptors, assessment of cognitive skills of knowledge acquisition, analysis, and synthesis by experts in various fields, and traditional paper and pencil testing. Nevertheless, students were still disgruntled. A common complaint was that evaluation procedures, especially examinations, did not appropriately cover the material presented in the module. Students frequently also expressed the concern that because the faculty were variable, certain groups might have the advantage of receiving “higher” marks from “easier” teachers.

STUDENT PERFORMANCE

DISCUSSION

Commonalities with other Doctoring courses: Standardized patients, team coleaders (physician and non-physician), small group learning (tutorial groups), protected independent study time, community experts, clinical modules, incorporation and integration of small courses, worksets in clinical epidemiology, peer student teaching, medical informatics, and faculty development sessions.

Course Development: Change required the cooperation not only of Department Heads, but also the Directors of the specific courses. In the end, the overall concept of the PDII course was accepted by faculty based on their trust of the co-directors and Associate Dean, and empirical evidence that similar courses had worked at other institutions.

In terms of course modifications, it is probably preferable to have clearly articulated annual guidelines with enough flexibility to allow for major midcourse corrections.

One particular advantage of a course like PDII is that it allows for the formation of curriculum time for new areas, eg. Geriatrics, medical economics, cross-cultural medicine, death and dying, and medical information; and the use of the new course as a vehicle for the introduce of new courses, such as medical genetics, into the medical school curriculum. This sort of material can be refined and piloted in a PDII-type course, and then either remain as part of the course or develop into an independent course.

Faculty: In undertaking such a course, initiating faculty and administrators must be prepared for the difficulty of obtaining buy-in from faculty representing disparate personalities and visions about how such a goal should be implemented. They must also be prepared for the difficulty of sustaining commitment once the initial

glow has faded and the course must compete with other pressing faculty responsibilities.

To promote faculty commitment, there must be institutional recognition of teaching and time commitment as a valid determinant for promotion.

Faculty Development: Faculty development is critical to the success of a course such as PD II. Issues of how much and when need to be addressed early in course planning.

Paid and Volunteer Faculty: This course used a combination of paid and volunteer faculty. Despite some outstanding individual commitments from volunteer faculty, on the whole the opinion of the course co-directors was that paid faculty are more accountable, and therefore can be required to improve their performance. Paid faculty are more easily controlled, and issues such as meeting deadlines for return of evaluated materials, or last-minute cancellations, can be addressed more directly.

Preceptors: Should be broad-based primary care physicians rather than subspecialists.

Surrogate Patients: The course eventually switched from unpaid, volunteer surrogate patients to paid, trained standardized patients. This change resulted in a significantly better quality of student-patient encounter. Therefore, similar courses should strive to utilize standardized patients, and budget for them. If possible, we recommend the use of standardized patients throughout all modules, rather than the use of videotapes, real patients or paper cases. Real patients, for example, create a lack of standardization across student groups, whereas paper cases and even videotapes lack the immediacy of an actual human being.

Experts: While faculty expertise in different content areas of toxicology, nutrition, ethics, human sexuality, epidemiology, health economics, clinical medicine etc. is crucial to a successful integrative course like PDII, we recommend a limited number of committed broad-based experts able to work within the framework of the course. The experts' learning objectives must be carefully coordinated with the clinical content of each module, as well as with the learning objectives of the other modules, and with the overall objectives of the course.

Students: One pervasive fear among faculty was that without a tightly structured course, students would not read or study anything that they didn't have to.

COURSE COMPONENTS

Learning Objectives: In addition to student-initiated learning issues, PDII complements this approach with structured learning objectives developed by faculty experts in specific learning areas. Despite some evidence that the majority of learning issues identified by faculty are independently discovered by students, faculty at this institution felt it was critical in terms of providing uniformity across learning groups to provide formal written learning objectives as well.

Expert Sessions: Required, rather than optional, contact with experts was a positive innovation in PDII as compared to other Doctoring courses. We concluded that systematic student exposure to experts in the range of content areas covered in the PDII course was a valuable learning experience. Therefore, there was formally scheduled curricular time for these encounters, and students were expected to prepare for this session through their independent library research. The small group format was particularly successful in promoting interaction and discussion. A major flaw in this system was that, in a given module, only 12 students would have direct contact with any given expert. For the information presented by the other experts during that module, they were dependent on peer learning from their fellow students in the Rap session. This peer teaching, while having considerable potential, never assuaged student and faculty concerns regarding the appropriate transmission of knowledge.

Medical Informatics: A major emphasis on medical informatics was crucial to the success of the independent study and research component of the course.

Role-playing Reinterviews: Another innovation in PDII was the use of role-playing reinterviews in which students had to apply their learning from the previous month's activities in the direct solution of patient problems.

History-Taking and Physical Diagnosis Combined with "Doctor-Patient": Innovation of integrating a "doctor-patient," "medicine and society" type course with History Taking and Physical Diagnosis.

The approach to History and Physical described here attempted to systematize and standardize student exposure to various signs, symptoms, and conditions. However, in actuality a concern remains regarding the lack of uniformity of the clinical experience.

In terms of teaching continuity, we conclude that the same preceptors should be used for all systems. Also, our experience with student partners for normal physical exams, that for reasons of modesty and cross-cultural considerations, it is preferable to use volunteers.

Table 2

Defined Learning Objectives from the Cardiovascular Module

Physical Examination and Diagnosis Courses

- The student will be able to complete and report a comprehensive physical exam of the cardiac and vascular system.

Epidemiology/Biostatistics

- The student will be able to define the concept of risk, relative risk, and attributable risk.
- The student will be able to discuss the risk factors for atherosclerotic cardiovascular disease.

Behavioral Science

- The student will be able to discuss the relation of emotional issues to a patient's perception of health status and specifically discuss the somatic complaint as depressive equivalent.
- The student will be able to discuss the concept of stress and the relation of stress to organic illness.
- The student will be able to define Type A and Type B personalities and discuss the role of personality types in the development of atherosclerotic cardiovascular disease.
- The student will be able to discuss the approach to identify and interview the reluctant patient.
- The student will be able to discuss the role of behavior modification techniques in producing lifestyle changes for risk reduction in coronary disease.
- *The student will explore acute anxiety reactions*

Nutrition

- The student will be able to discuss the role of diet in the development of atherosclerotic cardiovascular disease.
- The student will be able to discuss the role of dietary manipulation in the treatment of hyperlipidemia and the prevention of atherosclerotic cardiovascular disease.

Human Sexuality

- The student will be able to discuss the impact of perceptions of health and illness on sexual functioning.
- The student will be able to discuss the impact of stress, anxiety, depression, and self-image on sexuality.

- The student will be able to discuss the cardiovascular effects of sexual activity, the relative exertion required for sexual activity, and ways to modify sexual activity to accommodate deficiencies of cardiovascular or pulmonary function.

Bioethics

- The student will be able to define and confront gender related biases in the evaluation, prevention, and treatment of disease.
- The student will be able to define the issues contained in the distinction between paternalism and autonomy in the relation between patient and physician. The student will be able to use the concepts of relative risk reduction and absolute risk reduction, and to discuss how manipulation of these concepts might lead the patient to very different conclusions about the personal value of risk reduction measures. The broader issue here is framing the provision of information given in the doctor-patient relationship.
- The student will be able to define "disability" in the medical context and to discuss the reasons a patient might seek disability, the physicians role in disability evaluation, and the ethical issues involved in granting or refusing disability.
- The student will be able to define the ethical issues involved in recommending broad based lifestyle changes to individuals or communities, most of whom would not have developed the disease for which the changes are being recommended.

Toxicology

- The student will be able to identify environmental and occupational exposures that can cause cardiovascular disease and will be able to discuss possible mechanisms.
- The student will be able to discuss exacerbation of pre-existing cardiovascular diseases by environmental agents (e.g. carbon monoxide/angina).

Preventive Medicine

- The student will be able to define the concepts of risk reduction, primary prevention, and secondary prevention.
- The student will be able to cite the literature on and discuss the scientific evidence for the efficacy of the following in reducing the risk for clinical coronary artery disease: smoking cessation, exercise, diet, lipid lowering drugs, antioxidant drugs, anti-platelet medications, stress reduction, blood pressure control, estrogens.
- The student will be able to discuss the National Cholesterol Education Project guidelines for screening and treatment of hypercholesterolemia.
- The student will be able to discuss the Toronto Working Group Guidelines for screening and treatment of hyperlipidemia.

Medical Economics

- The student will be able to discuss the effect of loss of health insurance on access to health care.

- The student will be able to discuss alternative routes of access to health care, patient options for obtaining care, and the eligibility requirements for various public health care programs in Orange County.

Human Genetics

- The student will be able to define the role of genetics in the development of coronary artery disease.

STUDENT SATISFACTION: SPECIFIC CONTENT AREAS 1996

HEALTH ECONOMICS

N = 43

Instruction: $\bar{x} = 3.4$ s.d. = .88
Course: $\bar{x} = 3.02$ s.d. = .92

GERIATRICS

N = 44

Instruction: $\bar{x} = 3.95$ s.d. = .81
Course: $\bar{x} = 3.46$ s.d. = .80

MEDICAL SOCIOLOGY

N = 38

Instruction: $\bar{x} = 3.32$ s.d. = .87
Course: $\bar{x} = 3.05$ s.d. = .83

PEDIATRICS

N = 44

Instruction: $\bar{x} = 4.48$ s.d. = .70
Course: $\bar{x} = 3.80$ s.d. = .75

GENETICS

N = 32

Instruction: $\bar{x} = 3.97$ s.d. = .93
Course: $\bar{x} = 3.65$ s.d. = .97

STUDENT SATISFACTION: SPECIFIC CONTENT AREAS

Year	Content	Nutrition	Clinical Medicine	Behavioral Science	Epidemiology Biostatistics	Ethics	Toxicology	Sexual
1992	Instruction							
	N	81	44	44	44/44	44	44	44
	\bar{x}	2.97	3.07	3.36	2.61/2.23	3.73	3.36	2.82
	Sd	1.05	.93	1.57	1.04/.89	.95	1.00	1.28
	Course							
	N	81	44	44	44	44	44	44
\bar{x}	2.90	3.39	3.14	2.41/2.23	3.82	3.27	2.72	
Sd	1.03	1.02	.98	.92/.91	.87	1.02	1.32	
1993	Instruction							
	N	65	39	39	36	39	39	36
	\bar{x}	2.94	3.31	2.85	2.92/2.67	3.31	2.85	3.00
	SD	.99	1.03	.90	1.08/1.15	.48	.80	1.13
	Course							
	N	65	39	39	36	39	39	36
\bar{x}	2.85	3.08	2.85	2.92/2.58	3.54	2.77	2.83	
Sd	.98	1.26	1.07	1.08/1.16	.66	.83	1.11	
1996	Instruction							
	N	62	61	64	55	67	48	59
	\bar{x}	3.71	3.49	3.97	2.65	4.39	3.69	3.90
	Sd	.93	2.66	.64	1.34	.83	.97	1.09
	Course							
	N	62	61	64	55	67	48	59
\bar{x}	3.33	2.87	3.36	2.56	3.68	3.02	3.48	
Sd	1.01	1.14	1.03	.98/1.04	.77	.95	1.17	

OVERALL CURRICULUM SATISFACTION

	1989	1992	1993
n	86	81	39
\bar{x}	2.35	2.75	3.46
Sd	.97	.99	.94

**PDII CO-LEADER EVALUATION
SUMMARY
1995-1996 ACADEMIC YEAR**

YEAR-END CO-LEADER EVALUATION SUMMARY		
	MD Co-Leaders	Non-MD Co-Leaders
N	14	8
\bar{x}	3.39	3.55
Sd	.047	.057

**PDII CO-LEADER EVALUATION
SUMMARY
1995-1996 ACADEMIC YEAR**

YEAR-END CO-LEADER EVALUATION SUMMARY		
	MD Co-Leaders	Non-MD Co-Leaders
N	14	8
\bar{x}	3.39	3.55
Sd	.047	.057