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Bart Waldman

Primary Care Education Trends in U.S. Medical Schools and Teaching Hospitals
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The Myth of Professional Isolation Among Physicians in Nonurban Areas
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Index to Volume 52

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Volume 52 • Number 12 • December 1977

Economic and Racial Disadvantage as Reflected in Traditional Medical School Selection Factors—Bart Waldman 961

Primary Care Education Trends in U.S. Medical Schools and Teaching Hospitals—Joseph J. Giacalone and James I. Hudson 971

Undergraduate Education in Primary Care: The Rockford Experience—Joseph G. Pittman and Daniel M. Barr 982

The Myth of Professional Isolation Among Physicians in Nonurban Areas—Dalia G. Ducker 991

Communications: The 'One-and-Two' Program: A New Direction in Family Practice Residency Training—John P. Geyman 999

Pao's Selection Method for Quality Papers and the Subsequent Use of Medical Literature—Bert Boyce and Karen Primov 1001

The Portable Patient Problem Pack: A Problem-Based Learning Unit—Howard S. Barrows and Robyn M. Tamblyn 1002

A Podiatric Medical Residency Program in an Academic Health Science Center—Louis T. Bogy, Herschel L. Douglas, and Leonard A. Levy 1005

Editorial: Professional Isolation 1008

Datagram: Applications Versus Acceptances to 1976–77 First-Year Medical School Class 1010

Book Review 1013

Bibliography 1015

Letters to the Editor 1020

Index to Volume 52 1021

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Economic and Racial Disadvantage as Reflected In Traditional Medical School Selection Factors

Bart Waldman

Abstract—Medical College Admission Test scores and undergraduate grade-point averages show that both lower income applicants in general and minority applicants in particular are at a competitive disadvantage in gaining admission to medical school. This study examines the extent to which income and race, viewed independently of one another, affect these selection factors. By analyzing data collected by the Association of American Medical Colleges on applicants to the 1976–77 entering class, factors associated with race were found to have a far more significant influence on applicants' credentials than factors associated with lower family income. An admissions policy based exclusively on GPAs and/or MCAT scores would proportionately exclude minority applicants from medical education but would have no similar effect on lower income white applicants.

Previous data published by the Association of American Medical Colleges (AAMC) have indicated that applicants to medical school from minority groups traditionally underrepresented in medicine generally present credentials reflecting a lower level of achievement on the Medical College Admission Test (MCAT) and in undergraduate grade-point averages (GPAs) than do their white counterparts (1, 2). Similar data have also shown that performance on these traditional measures bears a positive though lesser relationship to the applicant's level of parental income (1). However, no previous national study has attempted to analyze the interrelationship of these factors to determine (*a*) whether, within a given racial group, applicants' GPAs and MCAT scores vary substantially according to parental income and (*b*) whether, within a given income group, applicants' GPAs and MCAT scores vary substantially according to race.

This study was conducted in an attempt to answer these questions. Further, the investigator attempts to evaluate the answers in order to reach very general conclusions as to the comparative levels of economic and racial disadvantage inherent in the use of GPAs and MCAT scores as criteria for admission to medical school.

When reviewing these data, the reader should bear in mind that small discrepancies in GPAs and MCAT scores are not necessarily predictive of success in medical school. For example, comparative graduation rates for students with scores on the MCAT Science subtest of 500 to 549 and 600 to 649 were 93 percent and 95 percent, respectively, when analyzed for the more than 75,000

Mr. Waldman is special assistant to the president, Association of American Medical Colleges, Washington, D.C.

students who entered U.S. medical schools during 1949–58 and who were followed longitudinally through the fall of 1962 (3).

More recent reports indicate that retention rates are now even higher (4, 5). Ninety-five percent of all 1968–69 entrants had received the M.D. degree by 1973, and an additional 1 percent of the students were still in school, for a net attrition of only 4 percent. Although the retention rate for the underrepresented minorities was slightly lower than that for all entrants, 89 percent had already graduated by 1973, and 91 percent were expected to graduate eventually despite relatively modest undergraduate GPAs and MCAT scores (4). And first-year retention of black Americans has risen from 91 percent of 1971–72 entrants to 95 percent of 1974–75 entrants (5). Thus, the reader should not assume that lower performance on these measures necessarily implies that an individual is unqualified for the study of medicine.

Method

The data base for all displays and analyses is the AAMC Medical Student Information System records for applicants and acceptees to the 1976–77 entering class at U.S. medical schools. The two principal data collection sources for these records are the MCAT and applications submitted to the American Medical College Application Service (AMCAS). Data from these sources have been supplemented by routine admissions reports from each medical school.

The study utilizes the following variables:

1. Parental income. Those applicants reporting gross combined parental income of less than $10,000 are differentiated from those reporting parental income of $10,000 or more. Incomes reported are for the calendar year prior to taking the MCAT (in most cases for calendar year 1974).

2. Racial background. The racial descriptor is based on the applicant's self-description; although some data displayed pertain specifically to black Americans, all comparative analyses are between whites and "underrepresented minorities" (defined as black Americans, Mexican American, American Indians, and mainland Puerto Ricans).

3. Undergraduate college grade-point averages. The GPAs have been converted by AMCAS to a uniform system of grading based on a scale of 0.0 to 4.0.

4. Medical College Admission Test scores. Separate subtest scores for Verbal Ability, Quantitative Ability, General Information, and Science are reported.

The data presented reflect the total information available within the AAMC Medical Student Information System for the 42,155 applicants and the 15,774 acceptees to the 1976–77 first-year class. The analyses necessarily were limited to those individuals for whom GPAs, MCAT scores, racial identification, and parental income were reported. Grade-point averages were unavailable for 4,916 applicants (11.7 percent of all applicants) and for 1,298 acceptees (8.2 percent of all acceptees). Medical College Admission Test scores were unavailable for 869 applicants (2.1 percent) and for 190 acceptees (1.2 percent). Racial identification was not reported by 2,210 applicants (5.2 percent) and by 558 acceptees (3.5 percent). Parental income was not reported by 1,826 applicants (4.3 percent) and by 457 acceptees (2.9 percent). In addition, the mean GPAs reported in Tables 1 and 2 reflect only those applicants who filed at least one application through AMCAS and, therefore, exclude applicants who applied only to one or more of the 29 schools which did not participate in AMCAS in 1976.

TABLE 1
MEAN UNDERGRADUATE GRADE-POINT AVERAGES AND MEAN MEDICAL COLLEGE ADMISSION TEST SCORES OF APPLICANTS TO THE 1976–77 FIRST-YEAR U.S. MEDICAL SCHOOL CLASS, BY RACE AND PARENTAL INCOME

Academic Measure*	All Applicants		White		Underrepresented Minorities†		Black American	
	$10,000 or More	Less Than $10,000	$10,000 or More	Less Than $10,000	$10,000 or More	Less Than $10,000	$10,000 or More	Less Than $10,000
Undergraduate GPA								
No. with known GPAs	31,089	5,101	27,139	3,191	1,725	1,238	1,249	899
BCPM GPA‡								
Mean	3.25	3.07	3.29	3.22	2.64	2.64	2.54	2.58
S.D.	.48	.57	.44	.48	.58	.58	.54	.57
AO GPA§								
Mean	3.37	3.24	3.39	3.33	3.00	2.98	2.93	2.94
S.D.	.42	.48	.41	.44	.49	.49	.48	.49
Total GPA								
Mean	3.30	3.15	3.34	3.27	2.80	2.79	2.71	2.74
S.D.	.41	.48	.38	.42	.48	.49	.46	.47
MCAT subtest								
No. with MCAT scores	34,351	5,977	29,235	3,527	1,965	1,416	1,391	1,015
Verbal Ability								
Mean	545	510	553	548	466	438	450	424
S.D.	89	103	80	89	95	89	89	85
Quantitative Ability								
Mean	597	554	605	584	502	479	483	463
S.D.	95	104	83	90	95	92	90	85
General Information								
Mean	532	503	539	533	469	446	454	434
S.D.	74	84	66	76	74	68	66	63
Science								
Mean	579	535	589	571	480	456	459	440
S.D.	90	104	76	86	97	93	90	89

* Sixty-eight percent of grades or scores lie within one standard deviation of the mean (68 percent of all applicants with parental incomes of $10,000 or more had BCPM GPAs of between 2.77 and 3.73).
† American Indians, black Americans, Mexican Americans, and mainland Puerto Ricans.
‡ Courses in biology, chemistry, physics, and mathematics.
§ All other courses.

TABLE 2

MEAN UNDERGRADUATE GRADE-POINT AVERAGES AND MEAN MEDICAL COLLEGE ADMISSION TEST SCORES OF ACCEPTEES TO THE 1976–77 FIRST-YEAR U. S. MEDICAL SCHOOL CLASS, BY RACE AND PARENTAL INCOME

Academic Measure*	All Acceptees		White		Underrepresented Minorities†		Black Americans	
	$10,000 or More	Less Than $10,000	$10,000 or More	Less Than $10,000	$10,000 or More	Less Than $10,000	$10,000 or More	Less Than $10,000
Undergraduate GPA								
No. with known GPAs	12,549	1,655	11,021	1,006	757	462	556	317
BCPM GPA‡								
Mean	3.50	3.36	3.55	3.54	2.87	2.93	2.78	2.87
S.D.	.38	.49	.33	.34	.53	.52	.51	.52
AO GPA§								
Mean	3.54	3.43	3.56	3.54	3.18	3.14	3.13	3.11
S.D.	.35	.43	.33	.35	.45	.47	.45	.47
Total GPA								
Mean	3.52	3.39	3.55	3.54	3.00	3.02	2.93	2.98
S.D.	.33	.42	.29	.31	.45	.44	.43	.44
MCAT subtest								
No. with MCAT scores	13,475	1,842	11,680	1,080	814	505	597	343
Verbal Ability								
Mean	577	544	582	580	502	471	489	457
S.D.	81	98	78	83	91	87	88	83
Quantitative Ability								
Mean	638	600	645	631	542	525	529	512
S.D.	78	94	73	76	88	85	86	81
General Information								
Mean	552	526	557	555	490	467	478	456
S.D.	73	84	71	75	73	69	66	65
Science								
Mean	622	589	629	625	529	513	516	499
S.D.	67	85	62	64	81	78	76	77

* Sixty-eight percent of grades or scores lie within one standard deviation of the mean (68 percent of all acceptees with parental incomes of $10,000 or more had BCPM GPAs of between 3.12 and 3.88).

† American Indians, black Americans, Mexican Americans, and mainland Puerto Ricans.

‡ Courses in biology, chemistry, physics, and mathematics.

§ All other courses.

Otherwise, all data reflect the total pool of applicants to the 1976–77 first-year class who took the MCAT examination at any time.

Findings

The major finding of this study is that performance on the MCAT and in undergraduate school (as reflected in GPA), both traditional medical school selection factors, is much more closely related to racial background than to economic background. This relationship exists for both applicants and acceptees.

As shown graphically in Figures 1 through 3, the distributions of GPAs and of MCAT scores are very similar for lower income and higher income whites. Likewise, the distributions are very similar for lower income and higher income underrepresented minorities. Although the lower income applicants within the given racial grouping consistently perform slightly less well than their higher income counterparts, the difference between these two groups does not approach the magnitude of the disparity between white applicants and underrepresented minority applicants, even in the same income range.

These findings are supported by the mean data summarized in Tables 1 and 2. These displays show that the mean total GPAs of the higher income and lower income white applicants are very similar (3.34 and 3.27, respectively). The mean total GPAs of the higher income and lower income underrepresented mi-

FIGURE 1

Undergraduate GPAs of applicants and acceptees to 1976–77 entering class of U.S. medical schools, by race and parental income.

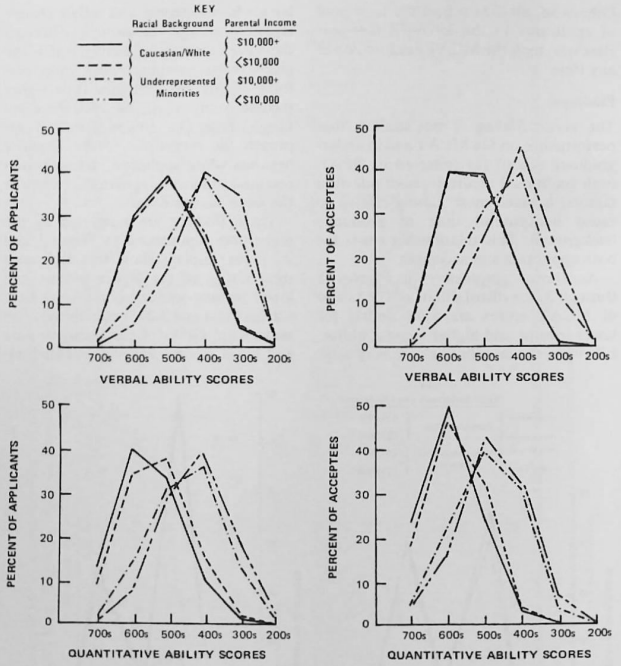


FIGURE 2

Verbal Ability and Quantitative Ability MCAT subtest scores of applicants and acceptees to 1976–77 entering class of U.S. medical schools, by race and parental income.

nority applicants are also essentially identical (2.80 and 2.79, respectively). However, the difference in mean GPAs between lower income white and lower income underrepresented minority applicants is .48, and the difference between higher income white and higher income underrepresented minority applicants is .54 (derived from Table 1).

Table 2 shows that the mean total GPAs of the higher income and lower income white acceptees to the 1976–77 first-year class are also essentially identical (3.55 and 3.54, respectively). Likewise, the mean total GPAs of the higher income and lower income underrepresented minority acceptees are virtually the same (3.00 and 3.02, respectively).

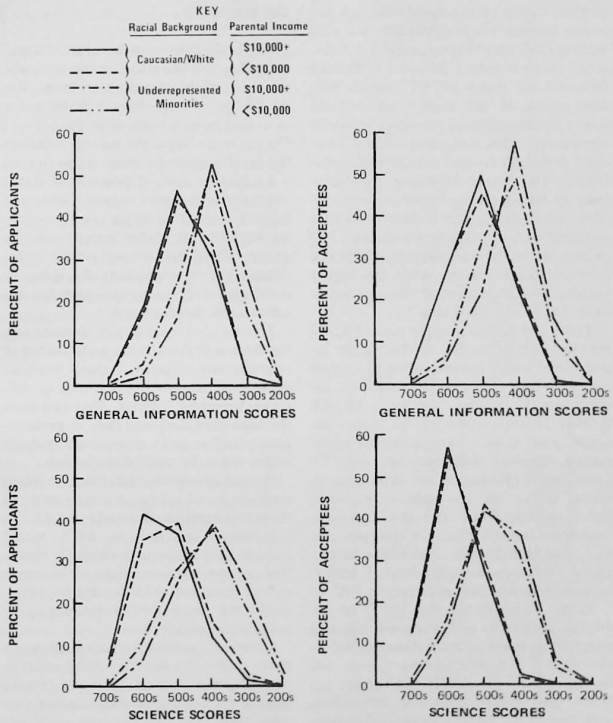


FIGURE 3

General Information and Science MCAT subtest scores of applicants and acceptees of 1976–77 entering class of U.S. Medical schools, by race and parental income.

However, the difference in mean GPAs between lower income white and lower income underrepresented minority acceptees is .52, and the difference between higher income white and higher income underrepresented minority acceptees is .55.

Similar results are found for the mean MCAT scores presented in Tables 1 and 2. For example, the mean MCAT Science

subtest scores of the higher income and lower income white applicants are very similar (589 and 571, respectively). Likewise, there is only a 24-point difference between the mean MCAT Science subtest scores of the higher income and lower income underrepresented minority applicants. This compares with a standard deviation on that subtest of approximately 100 points. However, the difference in mean scores between lower income white and lower income underrepresented minority applicants is over 100 points, as is the comparable difference between higher income white and higher income underrepresented minority applicants (derived from Table 1).

Table 2 indicates that the mean MCAT Science subtest scores of the higher income and lower income white acceptees are also very similar (629 and 625, respectively). Likewise, the mean MCAT Science subtest scores of the higher income and lower income underrepresented minority acceptees are only 16 points apart. However, the difference in mean scores on the subtest between lower income white and lower income underrepresented minority acceptees is 112, and the difference between higher income white and higher income underrepresented minority acceptees is 100.

Table 1 also shows that 5,977 of the 40,328 applicants with known scores and parental incomes identified themselves in the under $10,000 income group. Of these, 3,527 identified themselves as white and 1,416 identified themselves with one of the underrepresented minority groups. The remaining 1,034 students either identified themselves with another ethnic/racial group or failed to answer the self-identification question. It is generally presumed that most of those failing to answer this question are white applicants.

Discussion

These findings demonstrate that an applicant's lower economic status alone results in a very slight, if any, competitive disadvantage because of lower performance in undergraduate work or on the MCAT. On the other hand, the variety of factors involved in minority racial status confers a far greater level of educational disadvantage which results in lower GPAs and MCAT scores and which is only slightly alleviated in the higher income minority group. These data do not permit an assessment of the social and cultural factors associated with race which underlie this educational disadvantage.

Figures 1–3 graphically demonstrate the degree of disparity in performance of minority and majority students on these traditional measures of academic qualification for medical school. They also show the high degree of congruity of performance of higher and lower income students within the same racial classification.

If medical schools had chosen to admit students based solely on one or more of these five traditional criteria, the 15,774 acceptances offered in 1976 would quickly have gone to individuals identified at the extreme high performance side of the curve. At this extreme, only a very small proportion of minority applicants could qualify.

However, admission based solely on these traditional criteria would result in only slight exclusion of lower income applicants, since their performance parallels that of the higher income applicants of the same racial group. Only to the extent that greater numbers of lower income applicants also belong to the minority population would lower income applicants be denied admission disproportionately. What seems evident, however, is that those students accepted from lower income families would also be overwhelmingly white.

For example, two traditional criteria often considered most influential by medical school admission committees are MCAT Science subtest scores and GPAs. If medical schools were to select students solely on the basis of MCAT Science subtest scores, the data indicate that a student would need a score of approximately 605 or better to qualify. This was derived by assuming that only whites and underrepresented minorities reporting racial self-description are applying for admission and by admitting only those with the highest scores. Of the 15,774 acceptances, 15,444 would be offered to whites and 330 to minority candidates. Of the total acceptances, 1,496 would be offered to students from the lower income group; 1,398 of these students would be white and 98 would be underrepresented minority group members. Thus, only 6.6 percent of the lower income students and only 2.1 percent of the total class would be underrepresented minorities. In comparison, underrepresented minorities would comprise 28.6 percent of the lower income applicants and 9.4 percent of the total applicants. Since this model ignores applicants and acceptees who are nonwhites not from underrepresented minorities or who failed to specify racial background (in reality, there were 5,167 applicants and 1,423 acceptees in 1976 who fell in one of these two categories), it tends to overestimate the degree of underrepresented minority representation which would be achieved.

If the medical schools followed the same admissions model but applied GPAs as the sole criterion instead of MCAT Science subtest scores, minority representation would climb to 448 and white acceptances would total 15,326.

TABLE 3

COMPOSITION OF FIRST-YEAR U. S. MEDICAL SCHOOL CLASS SELECTED ON THE BASIS OF VARIOUS MODELS*

Category	Total						White						Underrepresented Minority					
	All		$10,000 or More		Less Than $10,000		All		$10,000 or More		Less Than $10,000		All		$10,000 or More		Less Than $10,000	
	No.	Percent†	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Applicants	36,143	100	31,200	86.3	4,943	13.7	32,762	90.7	29,235	80.9	3,527	9.8	3,381	9.4	1,965	5.4	1,416	3.9
Acceptees																		
MCAT model	15,774	100	14,278	90.5	1,496	9.5	15,444	97.9	14,046	89.0	1,398	8.9	330	2.1	232	1.5	98	0.6
GPA model	15,774	100	14,141	89.7	1,633	10.4	15,326	97.2	13,878	88.0	1,448	9.2	448	2.8	263	1.7	185	1.2

* Assuming applicants are limited to those whites and underrepresented minorities who actually applied for admission to the 1976–77 entering class and who reported racial self-description and parental income.

† All percentages reflect a comparison with the total figure in the first column.

The cutoff score for admission would be approximately a 3.38 GPA. Of the 15,774 acceptances, 1,633 would go to lower income applicants – 1,448 to whites and 185 to underrepresented minorities. Thus, in this model 11.3 percent of the lower income acceptances and 2.8 percent of the total class would be underrepresented minorities. It must be noted, however, that this model makes no attempt to weight grades according to the quality or grading practices of the applicants' undergraduate institution.

In both of the above models the rate of acceptance of lower income applicants falls only slightly below their rate of application. Lower income applicants constitute 13.7 percent of the total pool of white and underrepresented minority applicants (10.8 percent of white applicants and 41.9 percent of minority applicants). In the MCAT Science subtest score model 1,496 lower income students were admitted. This amounts to 9.5 percent of all acceptances. In the GPA model, 1,633 lower income students (10.4 percent of all acceptances) were admitted. The data from these models are displayed in Table 3.

Although no school would be likely to apply a single criterion for admission, emphasis on these two criteria in the absence of any special admissions program would tend to produce results in the range predicted by these models. What seems apparent from these analyses is that while lower income white students generally would not suffer any severe disadvantage from the use of these traditional criteria, underrepresented minority applicants clearly would. Furthermore, the racial disadvantage reflected in these models and in Figures 1–3 appears to be based on factors which transcend purely economic considerations.

Thus, within a given ethnic/racial grouping, applicants' GPAs and MCAT scores vary only slightly according to parental income. But within a given income group applicants' GPAs and MCAT scores vary far more substantially according to race. From these observations it seems reasonable to conclude that lower income applicants as a class are not educationally disadvantaged in applying for admission to medical school, while applicants from underrepresented minority groups are disadvantaged by factors, extending beyond economics, which lead to a lower level of performance as reflected in GPAs and MCAT scores.

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Primary Care Education Trends In U.S. Medical Schools and Teaching Hospitals

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Abstract – In 1973 Schroeder and colleagues conducted a survey of U.S. medical schools in order to ascertain the nature of change in primary care education which had occurred by that date. In 1976 the authors of the present paper utilized the same survey instrument to document trend data over the three-year period. While conclusions from the 1973 survey pictured primary care education in a transitional state, the 1976 data suggest movement toward a general consolidation of efforts. The 1976 data indicate a continued emphasis on education in the ambulatory care area with no well-defined locus for coordinating institutionwide primary care training efforts, a leveling off of interest in health maintenance organizations (HMO) affiliations, no significant change in the number of affiliated programs for training nurse practitioners or physician's assistants, and a marked increase in the number of schools with affiliated generalist residency programs in internal medicine and pediatrics.

In the past decade new initiatives in primary care* education have been taken by virtually all the nation's medical schools and teaching hospitals. These programs vary in scope and in content. Almost universally, they have involved broader utilization of ambulatory care facilities for teaching; and in many instances they have resulted in major changes in affiliated residency programs. The changes so far initiated are likely to have serious implications with respect to future financing of medical education, particularly graduate medical education.

In 1973 Schroeder, Werner, and Piemme (2) conducted for the Association of American Medical Colleges (AAMC) a major survey of 116 U.S. medical schools, of which three were not involved in clinical teaching, in order to ascertain the nature of changes in primary care education which had occurred by that date. That survey supported the general impression that there had been intense activity in the development of primary care programs within these academic medical centers during the two to three years preceding the survey. What emerged was a picture of primary care education in transition with no clear pattern of optimum program development. The eventual shape of individual programs was projected as contingent both

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* The authors have adopted the Alpert and Charney (1) definition of primary care as first contact medicine which assumes longitudinal responsibility for the patient regardless of the presence or absence of disease and where the provider functions as an "integrationist" of health care for the patient.

upon the extent of commitment and priorities of the academic medical centers themselves and upon the amount of and conditions placed upon future public and private funding. The 1973 survey, therefore, characterizes primary care education as being in a state of transition. It was decided to repeat the survey at an appropriate interval in order to document the movement in primary care education efforts since 1973. Consequently, in 1976 a resurvey of the nation's 117 medical schools, of which two were not involved in clinical teaching, was carried out using a modification of the original survey instrument. The technique involved the use of a questionnaire presented to the medical schools' deans with the agreement that the responsibility for completion of this questionnaire would be vested in the office of the correspondent to the AAMC's Group on Medical Education. The survey instrument contained a number of questions related to primary care educational efforts. These were grouped into sections on ambulatory care teaching; prepaid medical care; new health practitioner education; graduate training in primary care; and general issues including health care research, health care management, and manpower data. The responses to this questionnaire are summarized in this report. Selected comparisons with the 1973 data are presented in order to highlight the trends in primary care education. Wherever possible, the same correspondent was responsible for providing both the 1973 and 1976 data. No attempt was made to validate responses in either of the surveys. The results are, therefore, subject to errors inherent in survey methodology.

Results

In 1973, 105 of the 113 applicable medical schools responded, for a 93 percent response rate. In 1976, the response rate was lower: 94 of the 115 applicable schools, a response rate of 81 percent. This lower rate in 1976 can be partially explained by the repetitive nature of the survey itself and also by the fact that the 1976 survey instrument was encumbered by additional data requests which were to be used in another study.

Because of the lower 1976 response rate, the AAMC Institutional Profile System (IPS) was employed to determine whether the survey respondents represent the universe of U.S. medical schools. The IPS was searched to ascertain data on four variables which were considered to be indicative of similarity or dissimilarity between the group of nonrespondents and respondents to the 1976 survey. The variables used from the IPS were geographic location, formal teaching of family medicine to undergraduate medical students, a formal program in primary care education at the undergraduate level, and a required ambulatory clerkship for medical students. The distribution of positive responses to these four variables between the nonrespondent and respondent groups was similar. Therefore, the assumption is made that the 81 percent response rate in 1976 is as representative of the U.S. medical schools as was the 93 percent response rate in 1973. All figures and tables display percentages of positive response.

Ambulatory Care Teaching

The extent of required ambulatory experience at the undergraduate level rose by 10 percent during the period between the studies. In 1973, 72 percent of the responding schools required such an experience; by 1976 this figure had increased to 82 percent. The survey also yielded data on the number of elective programs which provide long-term ambulatory experiences for medical students. In 1973, 28 percent of the schools had such programs, and in half of these more than 50 percent of the clinical students participated. In both of the surveys not one school responded as having no mandatory or elective ambulatory experience. In 1976, 78 percent of the schools offered a continuous, regularly scheduled ambulatory experience of 12 months' duration or longer; comparable data are not available for 1973.

The 1973 survey data indicated that few schools (27 percent) had identified a single locus for coordinating institutionwide ambulatory care education efforts. In the majority the efforts were still governed by individual departments. The same situation continued in 1976. In 1973, 6 percent of these programs were exclusively centered within the department of internal medicine. Three years later, none was so designated. Data analysis points to no single locus for this relocation of responsibility.

During this three-year interval the percentage of schools reporting the locus of responsibility for ambulatory care education in the department of family medicine went from 4 percent to 10 percent. This increase was found to be unrelated to the similar decrease in internal medicine. By 1976, 11 percent of the schools (represented by 10 institutions) reported the locus of responsibility in the department of community medicine or a new department labeled either primary care or health services. Further analysis of these 10 institutions, using the IPS, reveals that a mode of six were state supported and a mode of four were located in the Midwest; otherwise, there were no noteworthy uniform attributes.

Nonhospital ambulatory settings (satellite medical centers, community clinics, and the offices of private practitioners) appear to represent increasingly important resources for ambulatory teaching (Table 1). By 1976 over half of the schools reported that more than three quarters of the undergraduate students had nonhospital-based ambulatory experiences.

Prepaid Medical Care

In 1973, a year of heightened national interest in the health maintenance organization (HMO) movement, 15 percent of U.S. medical schools (representing a total of 15) had formal affiliations with functioning health maintenance organizations. Additionally, 40 percent (or 42 schools) indicated that they were in the planning or feasibility stage for the development of formal affiliations. By 1976, 16 percent of the schools (15 schools) had formal affiliations while significantly fewer schools than in 1973 (13 percent, or 12 schools; chi square = 22.47, $d.f. = 1, p < .05$) indicated an interest in pursuing feasibility or planning studies (Figure 1). This reduced interest in the development of HMO affiliations parallels the sharp decrease in the development of new HMOs on the national level. Several factors contributed to this change. The most significant factors are the restrictions associated with the 1973 HMO legislation (P.L. 93-222); these

TABLE 1

EXTENT OF NONHOSPITAL-BASED* UNDERGRADUATE AMBULATORY MEDICINE TEACHING AT ACADEMIC MEDICAL CENTERS RESPONDING TO 1973 AND 1976 SURVEYS

Percentage of Medical Students	Percentage of Academic Medical Centers	
	1973 ($N = 105$)	1976 ($N = 94$)
0–25	34	16
26–50	13	10
51–75	3	5
76–100	38	55
Unknown	11	14
Total	99	100

* Includes satellite medical centers, community-sponsored clinics, and private practitioners.

were corrected in 1976 by the series of HMO act amendments (P.L. 94-460). During the past three years medical schools have faced increasingly more severe financial stringencies. It is understandable that most medical schools are wary of assuming fiscal responsibility for a large service organization and that those which might contemplate affiliation are considering such only on the basis of an arrangement which does not involve them in major fiscal risk. Further analysis of the data indicates that during the three-year interval from 1973 to 1976, three new academic-medical-center-affiliated HMOs became operational, and two university HMO affiliations were terminated. There has been general growth and maturity in the HMO programs during the three years as demonstrated by enrollment figures. In 1973 the number of enrollees ranged from 450 to 30,000 with a mean of 9,500 and a median of 7,000. In 1976 the range varied from 2,000 to 153,000 with a mean of 41,000 and a median of 16,000.

In 1973, 60 percent of medical schools with HMO affiliations had some degree of student involvement in patient care delivered in that setting. By 1976 this figure had increased to 75 percent. House staff participation in the HMO setting, however, declined slightly from 60 percent in 1973 to 56 percent m 1976. These changes in student and house staff participation are not statistically significant.

New Health Practitioners

Data in Table 2 demonstrate academic medical center (AMC) involvement in affiliated educational programs for new

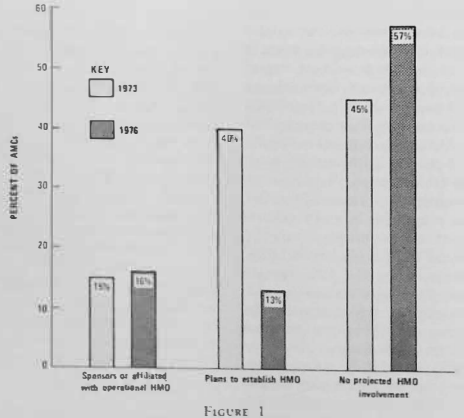


FIGURE 1

Involvement of academic medical centers (AMCs) in health maintenance organizations (HMOs), by percentage of institutions responding to question in 1973 (N = 105) and 1976 (N = 94) surveys.

TABLE 2

NUMBER OF NEW HEALTH PRACTITIONER GRADUATES AS REPORTED BY ACADEMIC MEDICAL CENTERS IN 1973 (N = 105) AND 1976 (N = 91) SURVEYS

Type of New Health Practitioners	Annual Number of Graduates		Mean Number of Graduates Per School		Percent of Academic Centers with NHP Programs	
	1973	1976	1973	1976	1973	1976
Physician's assistant	692	685	22	23	36	37
Nurse practitioner*	663	1,096	15	22	55	59
MEDEX	134	159	22	39	9	6
Nurse-midwife	176	73	16	9	19	13

* "Nurse practitioner" includes child health associates.

health practitioners, nurse practitioners, nurse midwives, and physician's assistants (PA) (including MEDEX). Between 1973 and 1976 the percentage of schools with PA programs remained relatively stable, MEDEX programs were reduced, nurse practitioner programs increased, and nurse midwife programs decreased. None of these changes were found to be statistically significant. In 1973, 66 percent of the schools had one or more new health practitioner training programs and 19 percent operated more than one type of program. By 1976, however, 81 percent of the schools responded that they had one or more training programs for new health practitioners, and 32 percent indicated affiliation with more than one type of program.

These figures reflect the three-year trend in medical schools affiliations with new health practitioner training programs and not the total number of such programs in either 1973 or 1976. Data from the Association of Physician Assistant Programs† and the American Academy of Physician's Assistants‡ reveal that in 1973 there were 36 PA training programs in academic medical centers and five located elsewhere, for a total of 41 programs. By 1976 the total number of programs had increased to 53, 37 affiliated with academic medical centers and 16 nonaffiliated.

The last complete national survey of nurse practitioner programs by the Division of Nursing, Bureau of Health Manpower, Department of Health, Education, and Welfare, was concluded in January 1974 (3, 4). As of that date, there were 131 programs nationally, 54 of which were identified through the AAMC survey in 1973 as being affiliated with academic medical centers. Supplemental national data not yet completely verified§ indicate that as of the end of 1976 there were 214 programs, 54 of these were identified in the 1976 survey as being affiliated with academic medical centers. The figures obtained from the surveys reported in this paper should be viewed with some caution; the less than 100 percent response to the questionnaire might leave some programs unreported. Also the data from the national nursing survey identified institutions with as many as eight separate nurse practitioner programs. These multiple programs may have been reported on the AAMC survey as a single program.

Table 2 depicts little change over the three-year period in the number of phy-

† Personal communication from the Association of Physician Assistant Programs.

‡ Personal communication from the American Academy of Physician's Assistants.

§ Personal communication from the Division of Nursing, Bureau of Health Manpower.

sician's assistant and MEDEX graduates per year, a moderate increase in the number of nurse practitioner graduates, and a decline in the number of graduating nurse midwives. These later data, however, are in sharp contrast to projections made by the National Center for Health Statistics which show 85 nurse midwives graduating in 1973 and 140 in 1976**. Other national data indicate that in 1974 there were about 900 physician's assistant graduates as compared with 10,400 physician graduates for a ratio of graduating physicians to PAs of 11.5:1. In 1976 there were 2,655 practicing PAs certified by the National Commission on Certification of Physician's Assistants and approximately 9,000 practicing nurse practitioners. Similarly, in 1976 it was estimated that there were approximately 300,000 practicing physicians in the United States. This gives a ratio of practicing physicians to certified physician's assistants and nurse practitioners in 1976 of 30:1.

The questionnaire was intended to document any trend there might be in the collaborative education of medical students and students of other health professions. The data indicate that 33 percent (23 schools) of the 69 schools responding to this question in 1973 had joint lecture or seminar programs involving undergraduate medical students and students of other health professions and 67 percent (46 schools) had programs in inpatient settings. The figures for 1976 were very similar: 35 percent (26 schools), 65 percent (48 schools), and 69 percent (51 schools), respectively. Similarly, there has been little change over the three-year period in the percentage of programs jointly involving new health practitioners and house staff in either the ambulatory setting or the inpatient area. In 1973 two-thirds of the programs indicated that house officers were used in the formal education of new health practitioners, a figure which remained essentially unchanged through 1976.

Extramural financial support for new health practitioner training in 1973 had been obtained by 82 percent of the academic medical centers; by 1976 this figure had dropped to 76 percent.

Graduate Physician Training

In 1973, 53 percent of the responding medical schools ($N = 105$) indicated that they had formal affiliations for graduate physician training in family medicine. Additionally, 26 percent indicated that they planned to develop such efforts in the immediate future. By contrast, in 1976 these figures were 80 percent and 9 percent, respectively ($N = 88$). Further analysis of the data indicates that most of the medical schools that were planning family medicine residency programs in 1973 had fully implemented these programs by 1976. In 1976, 9 percent of the schools indicated that they were still considering the development of family medicine residency programs. Of the 10 schools (11 percent) in 1976 which indicated that no family practice program existed or was contemplated, eight are privately owned and four are located in the Northeast, three in the South, and three in the Midwest.

Assignment of medical students to family medicine programs was reported by 77 percent of the schools in 1973. In 1976 this percentage had increased to 84 percent (not statistically significant).

By 1976 the majority of the AMCs had arrangements wherein the family medicine faculty had line responsibility for patient care in the principal university hospitals. The service units for this responsibility in 1976 were as follows: outpatient clinics, 62 percent of AMCs (68 percent in 1973), not significant; inpatient beds, 53 percent of AMCs (54 percent in 1973), not significant; the emergency room, 59 percent of AMCs (33 percent in 1973), chi-square = 13.9, $d.f. = 1, p < .05$.

The principal training centers for family medicine programs in 1976 were as follows: the main university hospital, 41 percent of AMCs (40 percent in 1973); a closely affiliated university hospital, 26 percent of AMCs (28 percent in 1973); a hospital affiliated chiefly for family medicine training activities, 22 percent of AMCs (21 percent in 1973); and a community hospital, 9 percent of AMCs (11 percent in 1973). This indicates no appreciable move over the three-year period toward more central location of family medicine training programs.

Administrative location for graduate family medicine programs within the academic medical centers are shown in Table 3. Between 1973 and 1976 there was a clearly demonstrable shift toward the department of family medicine or department of family and community medicine.

In 1973, 66 percent of the family medicine programs depended upon extramural support. By 1976 this figure had increased to 88 percent.

The availability of faculty may be a limiting factor in the development of family practice programs nationally. Table 4 displays comparative data regarding the range of family medicine faculty members among responding AMCs and the mean number of faculty members at each academic rank in family practice programs. From the data it can be seen that although the size of family medicine

** Personal communication from the National Center for Health Statistics.

TABLE 3

ADMINISTRATIVE LOCUS OF GRADUATE FAMILY MEDICINE PROGRAMS WITHIN RESPONDING ACADEMIC MEDICAL CENTERS, 1973 AND 1976

Administrative Locus	Academic Medical Centers			
	1973		1976	
	No.	Percent	No.	Percent
Department of family medicine	37	47	51	69
Department of community medicine	13	17	5	7
Department of family and community medicine	10	13	13	17
Interdepartmental or dean's office	10	13	3	4
Department of medicine	7	9	2	3
Department of pediatrics	1	1	0	0
Total	78	100	74	100

TABLE 4

AVERAGE NUMBER OF FULL-TIME FACULTY MEMBERS PREDOMINANTLY INVOLVED WITH FAMILY MEDICINE (FM) PROGRAMS IN RESPONDING ACADEMIC MEDICAL CENTERS BY ACADEMIC RANK, 1973 AND 1976

Faculty Rank	Mean No. of FM Faculty		Percentage of Total FM Faculty		Range Number of FM Faculty	
	1973	1976	1973 ($N = 64$)	1976 ($N = 71$)	1973	1976
Professor	0.8	1.4	13	18	0–3	0–8
Associate professor	1.5	2.1	25	28	0–9	0–17
Assistant professor	2.4	3.0	42	40	0–13	0–17
Instructor	1.2	1.1	20	14	0–22	0–5
Total	5.8	7.5	100	100	1–27	1–27

faculties varies greatly, the mean number of faculty members per institution increased between 1973 and 1976 (two-tailed t test = 2.04, $d.f.$ = 133, $p < .05$). Further analysis of these data indicates that most of the increases in academic appointments occurred at the higher faculty rank levels (chi-square = 96.64, $d.f.$ = 3, $p < .05$), indicating a continued growth of family medicine.

For AMCs involved in both new health practitioner training and graduate physician family medicine training, 50 percent shared a common clinical setting and 32 percent of these shared a common administrative locus in 1973. By 1976 these figures were 42 percent and 42 percent, respectively.

In both the 1973 and 1976 surveys much information was gained on residency programs in the other primary care specialties: internal medicine, pediatrics, and obstetrics/gynecology. The data displayed in Figure 2 show a dramatic increase in emphasis on generalist-oriented residency options in internal medicine and in pediatrics. There was a notable though less dramatic increase for obstetrics/gynecology. The data in Figure 2, however, represent only percentages of medical schools involved in one or more such programs and do not reflect total number of residency positions allocated to generalist training in these primary care specialty areas. The 1976 survey instrument was designed to reveal greater detail regarding graduate education in primary care. For example, in internal medicine, 1,836 (43 percent) of the 4,296 residency positions offered by respondent schools were in programs designated as emphasizing generalist training. Such generalist programs accounted for 858 (57 percent) of 1,509 pediatric residencies and 320 (47 percent) of 684 obstetrics/gynecology residencies. These numbers represent aggregates of postgraduate years one through four in each of the three specialties. While there is evidence for a marked increase in the number of schools with affiliated programs for training generalists in internal medicine and pediatrics, the total number of residency positions designated for generalist tracks in internal medicine still remained less than 50 percent. Data interpretation should take into account the fact that no rigid definition of the term "generalist" was employed in the questionnaire. That was left to the judgment of the individual completing the questionnaire; consequently, the interpretation of the term may vary somewhat. Residents completing programs which were not characterized as generalist in nature may quite well enter and remain in careers where most or all of their practice is within the definition of primary care. Conversely, there is no assur-

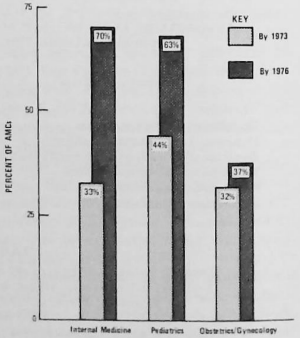


FIGURE 2

Percentage of academic medical centers (AMCs) responding to question in 1976 survey offering generalist residency positions, by specialty and date of program development. (The numbers responding to the question were: internal medicine, 86 AMCs; pediatrics, 85 AMCs; obstetrics/gynecology, 81 AMCs.)

ance that a resident in a program aimed at a generalist career may not decide to seek subspecialty training at the conclusion of such a program and eventually enter a practice not within the definition of primary care. Nevertheless, it is assumed that use of the term generalist under these circumstances will provide a reasonable estimate of the graduate medical education efforts directed specifically toward primary care careers. Furthermore, many of the practitioners with subspecialty certification provide a considerable amount of services which would qualify as primary care. This study has not addressed this broader question.

General Issues

Several questions related to primary care education were also included in the questionnaire. Following is a summary of the responses.

Health care research—In 1973, 58 percent of the medical schools reported faculty members involved exclusively or dominantly in health care research. By 1976 this figure had increased to 76 percent. In 1973 and 1976 most of the research was carried out in departments of preventive medicine or community medicine. Extramural fiscal support for health care research was reported in 66 percent of the AMCs in 1973 and in 88 percent in 1976. In 1973 the annual health care research budgets of AMCs ranged from $10,000 to $2 million with a mean of $212,000 and a median of $150,000. In 1976 the range was $10,000 to $7 million with a mean of $460,891 and a median of $125,000.

Training in health care management—Survey respondents also provided data on the degree of institutional involvement in presenting to medical students several issues concerning health care management. In 1973 considerable emphasis was placed on the organization of the health care system, legal and financial concerns in the provision of health care, public access to care and consumer behavior, and the quality of medical care. These topics became increasingly popular at academic medical centers through 1976. There was also a sizable increase in interest in issues pertaining to certification and accreditation of professionals and institutions, continuing medical education, medical audit and utilization review, and productivity of the health care system.

Health manpower—In both the initial and follow-up surveys medical schools were asked the extent to which they followed the career patterns of their graduates. In 1973, 48 percent of all schools reported that they formally reviewed career choices at graduation, only 15 percent five years later, and 12 percent at 10 years after graduation. Corresponding figures for 1976 show a marked increase to 65 percent (chi-square = 11.2 $d.f.$ = 1, $p < .05$) in the number of schools that review choices at graduation. The five- and 10-year review figures dropped to 12 percent and 5 percent, respectively. In 1976 the schools were also asked for data regarding the number of graduates completing residencies in internal medicine, pediatrics, family medicine, and obstetrics/gynecology with career preferences in primary care. Of those schools which did review career choices at graduation (61 schools or 65 percent), only 16 percent indicated that they had data on career preferences of their graduates and only 5 percent had knowledge of whether graduates actually embarked on careers in primary care. Not unexpectedly, the specialty department which most frequently had such information was family medicine.

Discussion

Comparative analysis of data obtained on primary care educational efforts in U.S. medical schools indicates that by

1973 there had emerged a growing emphasis on ambulatory experience in the education of undergraduate medical students. By 1976 more schools were making an ambulatory experience a required part of the curriculum, but the administrative locus of ambulatory care training efforts remained diffuse. Thus, in 1976 there still was no single model for the optimum design of institutionwide undergraduate medical education programs in primary care.

Paralleling the decline in interest in HMO development generally, the nation's medical schools seem to be increasingly reluctant to enter into new affiliations with these organizations.

No significant change in the number of academic medical centers with programs for the training of nurse practitioners and physician's assistants was observed over the three-year period. At present it is difficult to predict whether this trend will continue or whether, because of fiscal incentives contained in the 1976 health manpower legislation, there will soon be a repeat of the previous rapid growth trend in the development of affiliated programs for new health practitioners.

The past three years have brought continued growth in the development of affiliated residency programs in family medicine. By 1976, 80 percent of the responding schools had such programs. The 1976 health manpower legislation offers further incentives for schools to develop family medicine programs. The data indicate that an additional 9 percent of the schools are considering such programs. It is, therefore, safe to predict that within a few years as many as 90 percent of the medical schools will have affiliated family practice residency programs. While there has been a marked increase in the number of medical schools with affiliated residency programs training generalists in internal medicine and a similar trend for pediatrics, the proportion of residency positions in internal medicine which were described as being dedicated to the training of generalists remained less than 50 percent. It is likely that this percentage will increase over the next few years because of federal, state, and private foundation financial assistance. Given the current reimbursement problems for ambulatory care, it is doubtful that many of these generalist track programs in internal medicine, pediatrics, obstetrics/gynecology, and family medicine could exist without such direct grant support. The validity of the "generalist" designation for the residency positions could be more accurately ascertained if there existed methods for obtaining reliable data on student cohorts as they progress through residency programs and on into practice. Both in 1973 and in 1976 the survey results indicated that medical schools in the aggregate are ill-equipped to provide such data. This remains an issue of extreme importance for until there are accurate methods of determining eventual career choices and career patterns among graduating students, it will be almost impossible to evaluate fully the impact of such factors as admission processes favoring students interested in primary care, curriculum changes aimed at stressing primary care education, and certain changes within the area of postgraduate education.

While conclusions from the 1973 survey pictured primary care education in a transitional state, the 1976 data suggest movement toward a general consolidation of efforts at least at the graduate level.

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Undergraduate Education in Primary Care: The Rockford Experience

Joseph G. Pittman, M.D., and Daniel M. Barr, M.D.

Abstract—Four years of experience with an undergraduate program in primary care in a new community-based medical school are described. Students are intimately involved over a two-and-a-half-year period in the delivery of primary care in rural and semi-rural community health centers. Despite problems of financing and, especially, faculty recruitment and development, the program has been enthusiastically endorsed by students and patients and appears to represent a viable new model for medical education.

Responses to the growing national demand for more comprehensive, personal, and accessible medical care have been varied and intense. Current proposals to meet this demand encompass everything from major reliance upon physician extenders and health care teams to a total restructuring of the entire American system of health care. Medical educators have responded by supporting the naissant specialty of family practice and by developing primary care tracts within the traditional specialities of internal medicine and pediatrics. These efforts have been directed largely toward graduate training programs (1), although undergraduate comprehensive care programs have more than a 25-year history in the United States (2, 3).

The community-based medical school is another phenomenon born of the recent demand for more primary care physicians. These new and developing schools have been created largely for two reasons (4). The first reason is one of economics: the community-based medical school is designed to reduce the cost of producing physicians by utilizing existing inpatient facilities and by building faculties on a broad base of practicing physicians. The second reason has to do with a growing concern about the ability of traditional specialty- and research-oriented medical schools to respond rapidly and effectively to the need for producing clinically oriented physicians interested in pursuing careers in primary care in underserved areas. Being free of the rigidities imposed by the more traditionally structured medical schools with their university hospitals and well established administrative and faculty hierarchies, the new community-based medical schools have been more able to experiment with innovative educational programs designed to respond to the primary care needs of the nation. The following is a description of the initial results after four years of an undergraduate program in primary care in a new community-based medical school.

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In 1968 the University of Illinois College of Medicine began a long-range program to expand and to regionalize medical education throughout the state (5). In addition to the established Chicago campus enrolling more students, three new downstate campuses were created: a one-year school of basic medical sciences in Urbana-Champaign and two three-year clinical schools, one in Peoria and one in Rockford. Following one year of intensive basic medical sciences in Chicago or Urbana-Champaign, the student enters one of the three clinical schools: Abraham Lincoln (Chicago), Peoria, or Rockford.

The curriculum of the Rockford School of Medicine is heavily weighted toward primary care. After an initial eight-week period of courses designed to introduce the student to clinical medicine, each student is assigned to one of three community health centers (CHC). The student spends two half-day sessions per week in his CHC over the entire three years, the period of his matriculation at Rockford. The remainder of the curricular time is spent in Rockford and devoted to rotations through a series of organ-oriented courses and hospital-based clinical clerkships. Two prime considerations in the initial organization of the curriculum were the primary care experience and the goal of maintaining a faculty-to-student ratio of no less than one-to-three in all curricular segments. This resulted in a complicated assignment and scheduling process in which the CHC assignments for any individual student became the pivotal point. Built into the scheduling program was the nonvariable that each individual student's weekly CHC assignments must be separated by two days in order to permit him to follow the maximum number of assigned patients when they presented with urgent or semi-urgent problems. It is important to emphasize these points because they reflect the necessity of total faculty and administrative support for this type of long-term undergraduate experience in primary care.

The school's CHCs, which are the facilities for the primary care experience, were founded on the following educational and financial assumptions. It was assumed that early and continuous involvement of medical students in the provision of comprehensive and long-term primary care in a rural setting would have certain desirable results. The experience should both train and motivate students to follow careers in rural or semi-rural primary care. Offering the student an early opportunity to assume responsibility for patient care under appropriate faculty supervision should provide immediate relevancy to the knowledge and skills being taught in the other more traditional organ-oriented curricular segments. Self-review and peer review were built into the original program in an effort to acquaint the student with the concepts and benefits of an ongoing medical audit. The CHC program was also designed to incorporate the teaching of basic psychological skills such as interview techniques, interpersonal relations, and patient and physician attitudes toward disease. In addition, the development of a series of satellite rural clinics seemed to afford an ideal setting for fostering the team approach to the delivery of health care.

Financially, it was assumed that if the medical school underwrote approximately 90 percent of the salaries of the full-time faculty in primary care, the remainder of the cost of the program could be funded through fees generated on a fee-for-service basis from patients who were simultaneously being utilized for teaching purposes.

Population surveys conducted by the medical school's Office of Community Health Research have been invaluable and extremely accurate in predicting eventual patient utilization of the four community health centers established thus far in rural and semi-rural areas over the past five years. In one case the data generated by a careful population survey clearly indicated that the clinic would probably be a marginal operation. However, because the rapid expansion of the College of Medicine imposed a rigid time constraint (the first students were scheduled to arrive one year after the arrival of the first dean), a community (Kirkland, Illinois) was selected largely because it contained a vacant physician's office building that could be quickly renovated into a clinic. This clinic—the first to be opened (September 1972)—was subsequently closed because of low utilization and was merged in June 1975 with a more viable CHC 12 miles away.

In this program it has been assumed that no single specialty has a monopoly in the area of primary care. Physicians in general practice, family medicine, internal medicine, pediatrics, and preventive medicine have been actively sought and recruited.

Billings have been on a fee-for-service basis. All patients requesting medical services have been accepted without regard to ability to pay. There has been no attempt to establish a sliding scale according to financial need. The problem-oriented medical record is utilized, and patient records are filed by family rather than individual. Office hours are from 8:30 A.M. until 5:00 P.M. during the week except Wednesdays, when the units are closed at noon. The health centers are opened on Saturdays from 8:30 A.M. until 12:00 noon. Night and weekend coverage is provided through a central telephone answering service in Rockford, and "call" is taken on a rotational basis by all CHC physicians. Consultations, when needed, are arranged with specialists in Rockford as in a private practice.

Obstetrics has presented special problems. Because most of the CHC physicians have not had extensive training in obstetrics, only routine prenatal care and postpartum care have usually been provided at the CHC. Deliveries are performed on a contractual basis by a back-up panel of obstetricians in Rockford with the student physician in attendance.

As of January 1, 1976, the CHC program consisted of 11 full-time faculty physicians, 90 medical students, six third-year family practice residents (on a rotational basis), three full-time and three part-time psychiatrists, 18 office personnel, a five-member multidisciplinary health care team, and approximately 16,000 patients enrolled in the three clinics.

Results

Student acceptance of the CHC program has in general been enthusiastic. Early involvement of medical students in a primary care setting where they can assume increasing responsibility under the same group of faculty physicians for the long-term, comprehensive care of a defined panel of families seems highly desirable from an educational standpoint. The experience provides a strong stimulus to the acquisition of new knowledge and skills by giving immediate relevancy to the students' medical studies. It has permitted the development over a two-and-a-half year period of a close student-patient relationship and, in so doing, has allowed the student to judge for himself: (*a*) the rewards and problems arising from such an intimate professional relationship and (*b*) his own suitability for a lifelong career which demands this type of interpersonal relationship. Moreover, the CHC program creates an environment that encourages the medical student to function less as an undergraduate and more as a graduate student by permitting him to function as a colleague in a joint effort with the faculty. He is not merely the passive recipient of information but an active participant involved in the acquisition of new information and in the resolution of real problems. The program thus serves to hasten the maturation process from student to physician. Continuity of care is further encouraged by requiring students to make daily rounds in order to follow all of their patients requiring hospitalization. Their response to this emphasis on continuity has been especially positive toward the unique obstetrical experience provided by the CHC program. They are able to attend to their patients from the time of initial diagnosis of pregnancy through the pregnancy, the delivery, and the postpartum period, including newborn care.

Student experience in terms of problems seen is reasonably representative of primary care practice (Table 1). Students tend to provide more well-person, chronic disease, and psychiatric care and less acute care than do all providers in the program. Haggerty (6) also noted that long-term experiences (years) tend to result in less exposure to acute problems and greater exposure to scheduled care, whereas short-term (months), full-time experiences tend to minimize long-term observation and increase the acute care.

Student complaints about the program have included an inadequate number of patients, especially during the early phases of the program as the practices were growing; the high cost of commuting in terms of fuel and time (as much of 140 miles per week for students assigned to the most remote center); and the predictable conflicts with other curricular demands, especially during the senior year hospital clerkships.

The faculty is now in the process of developing a formal curricular document in primary care. Lacking such a document, faculty evaluation of student performance thus far has been subjective and anecdotal. However, the long-term intimate contact (two days per week for two and one-half years) has offered a unique opportunity for in-depth evaluation of each individual student's knowledge, skills, and attitudes.

Students plan and implement peer review of the medical care they deliver. Over the past three years the students have conducted 14 audits on a variety of topics related to ambulatory care, including diabetes mellitus, hypertension, pharyngitis, low back pain, obesity, otitis media, coronary risk factors, depression, oral contraceptives, urinary tract infections, immunizations, the minimal data base, organization of the medical record, and student practice activity. The early results of this program have been reviewed elsewhere (7).

Data regarding the ultimate career choices of the students who have participated in this primary care experience are still only fragmentary. The charter class of 19 students was graduated in June 1975. Approximately 75 percent of these graduates have entered residency programs usually considered as primary care specialties (family practice, internal medicine, and pediatrics). It may well be that there is a self-selection of students and

TABLE 1

FREQUENCY DISTRIBUTION OF THE MOST COMMON REASONS FOR VISITS IN DECREASING ORDER OF OCCURRENCE FOR MEDICAL STUDENTS COMPARED WITH ALL PROVIDERS OF CARE, ROCKFORD SCHOOL OF MEDICINE, COMMUNITY HEALTH CENTER PROGRAM, JUNE 21 TO DECEMBER 20, 1975

Reason	Medical Student Only			All Providers			Percent Care Provided by Students*
	Rank	No.	Percent	Rank	No.	Percent	
Child physical exam	1	734	7.1	1	869	4.9	84.5
Benign hypertension	2	618	6.0	2	769	4.4	80.4
Adult physical exam	3	474	4.6	3	580	3.3	81.7
Normal pregnancy	4	409	4.0	6	490	2.8	83.5
Upper respiratory infection	5	318	3.1	5	534	3.0	59.7
Pap smear	6	235	2.3	14	259	1.5	90.7
Diabetes mellitus	7	194	1.9	12	320	1.8	60.6
Exogenous obesity	8	192	1.9	13	314	1.8	61.1
Pelvic exam	9	188	1.8	18	208	1.2	90.4
Acute otitis media	10	182	1.7	7	375	2.1	48.5
Congestive heart failure	11	170	1.6	16	236	1.3	72.0
Neurotic depression	12	153	1.5	19	206	1.2	74.3
Oral contraceptive	13	152	1.5	21	184	1.0	82.6
Sprains and strains	14	150	1.5	11	327	1.9	45.9
Acute pharyngitis	15	144	1.4	10	354	2.0	40.7
Immunization	16	126	1.2	8	368	2.1	34.2
Backache	17	121	1.2	20	204	1.2	59.3
Anxiety with somatic symptoms	18	121	1.2	21	188	1.1	64.4
Vulvitis, vaginitis, cervicitis	19	121	1.2	25	162	0.9	74.7
Breast exam	20	117	1.1	28	128	0.7	91.4
Lacerations	21	110	1.1	9	355	2.0	31.0
Ill- definedconditions	22	104	1.0	24	167	0.9	62.3
Abdominal pain	23	87	0.8	26	161	0.9	54.0
Otitis externa	24	84	0.8	27	144	0.8	58.3
Urinary tract infection	25	72	0.7	23	172	1.0	41.9
Subtotal		5,697	55.1		7,754	44.0	73.5
All other reasons		4,642	44.9		9,858	56.0	47.1
Total		10,339	100.0		17,612	100.0	58.7

* Number of visits for thisreason in which a student provided the care divided by total number of visits for this reason multiplied by 100. This percentage thus reflects the relative student involvement in each type of problem seen

that those who chose the Rockford School of Medicine in lieu of one of the other two clinical schools may be those who were already interested in a primary care career. There is no evidence as yet to prove or disprove the assumption that the Rockford curriculum will influence the final career choices of its graduates.

PATIENT REACTIONS

Patient reactions to the CHC program have been and are being monitored by periodic surveys conducted by the Office for Community Health Research of the Rockford School of Medicine. Over 90 percent of patients have described themselves as satisfied with the medical care they have received; and of these over 50 percent felt "very satisfied." When patients were asked to compare the care they received at the CHCs with their previous medical care, four characteristics emerged as most improved: the time taken with the patient by the doctor (no distinction was made in the questionnaires between the student physicians and the faculty physicians), the time required to obtain an appointment, the waiting time in the office to see the doctor, and the attitude of the receptionists and the doctors' assistants toward the patient. Although judged better than before the advent of the CHCs, the cost of medical care and the availability of night-time care were deemed least improved.

Patients were also questioned about their reactions to the involvement of student physicians in their medical care. Approximately 14 percent preferred not seeing a student, while 42 percent indicated a definite desire or preference for the care rendered by medical students. A substantial proportion (44 percent) seemed indifferent as to whether they were seen by a member of the faculty or of the student body.

FINANCES

Medical school support for the CHC program has included a portion of all faculty salaries; the provision of psychiatrist teaching for 12 full-time equivalent days per month; educational supplies, such as closed-circuit television and a basic medical library, and a central administrative support staff. All other expenses, including capitalization costs, have been and are being paid for from money generated by fees for medical care provided by the faculty. At its inception the Rockford CHC medical practice plan was without funds. Start-up money was obtained on loan with interest from the established medical practice plan of the Abraham Lincoln School of Medicine, University of Illinois College of Medicine, in Chicago. Operational expenses for the first two years were also paid for partially by additional funds borrowed with interest from that plan. As of January 1, 1976, the entire debt incurred during the initial start-up phase had been retired and the CHC medical practice plan contained a surplus of $52,175. The rapid debt retirement was significantly aided by a multidisciplinary family health care preceptorship grant from the Department of Health, Education, and Welfare; however, without this financial assistance the CHC program would still have achieved a surplus of $32,705 by January 1976.

These data indicate that the original assumption concerning the funding of this program is thus far correct. Not only are the designated operational expenses being adequately met but also the CHC program over the next 20 years will purchase at least $1 million worth of land and buildings for the medical school—and considerably more if the present plans for expansion continue. In addition, the cost of a self-insured malpractice program for all full-time faculty has recently been assumed by the medical practice plan.

FACULTY

The most critical component of any educational program is the faculty. During the initial four years 16 physicians joined the full-time faculty engaged in undergraduate primary care education (Table 2). The following see m to be among the more outstanding characteristics of this group. It has be ena young faculty: nine of 16 were 34 years of age or younger at the time they joine dthe medical school. They have come from varied professional backgrounds. The largest single group of faculty members has bec nboard-certified in internal medicine, followed closely by those certified in family medicine and general practice. At the time of their initial appointments, 11 were board certified or eligible. Three have had some subspecialty interests (nuclear medicine, endocrinology, and preventive medicine)

TABLE 2
CHARACTERISTICS OF THE COMMUNITY HEALTH CENTER FACULTY AT THE TIME OF APPOINTMENT TO THE PROGRAM, 1972–1976

Year of Birth	Specialty*	Postgraduate Training (years)†	Board‡ Status	Scholarly Publications	Practice Experience (years)	Time with CHC Program (years)
		4		Yes	7	1§
1934	G P Peds	3	C	No	1	2§
1938	F P	1	C	No	4	2½§
1941	E R	5	I	No	8	4§
1931	I M G P	3	C	Yes	2	1§
1942	I P	4	E	No		2
1933	I M	4	E	No	0	2
1942	P M	2	I	Yes	0	2
1945	Surg	1	I	No	0	2
1924	G P	4	E	No	20	1
1942	I M	3	C	No	2	1
1942	I M	2	I	No	0	1§
1947	I M	5	I	No	2	1
1941	I M-P M	5	C	No		1
1929	I M	3	C	Yes	16	1
1946	F P	4	E	No	0	1
1928	G P Peds		E	No	16	½§

* G P = general practice, Peds = pediatrics, F P = family practice, E R = emergency room, I M = internal medicine, P M = preventive medicine, and Surg = surgery.
† Years of formal internship/residency training after medical school.
‡ C = certified, E = eligible and I = ineligible at time of initial appointment.
§ Resigned.

Prior to joining the faculty five had no patient care experience beyond formal residency and fellowship training programs. Only four had previously published one or more scholarly articles. Seven of the CHC faculty have resigned over the past four years. This is a high turnover rate even for a new medical school, and approaches the turnover rate of a typical three-year residency program.

Six major problem areas related to the primary care faculty have emerged.

Recruitment and retention—Recruitment efforts in Rockford over the past four years have been intensive. Over 300 contacts of potential faculty candidates have been made; 24 firm offers have been tendered, and 16 individuals have been accepted and eventually hired. The national demand for primary-care-physician-teachers clearly far exceeds the supply.

The other side of this problem—the retention of faculty—is somewhat more difficult to analyze. Reasons for resignations from the Rockford CHC faculty have been varied: the personal need for more practice experience before attempting to teach and serve as a role model in primary care, the attraction of higher incomes in private practice, and a sense of competition with the medical students for the available patients among the younger, less experienced physicians. The youthfulness, both of many of the faculty and of the medical school itself, has probably been a major factor in the relatively high turnover rate of the faculty, both the faculty and the school still are undergoing a maturation process.

Inappropriate training—Despite the varied backgrounds of the CHC faculty members, each shares one common historical fact: they have all been the products of a traditional medical school with

a low priority given to primary care and family medicine. Because of this, each faculty member without exception has had to undergo a sometimes painful period of adaptation and reorientation. These physicians have quickly recognized specific deficiencies in their own backgrounds and with the assistance of the medical school have attempted to correct them through on-the-job training and short formal courses. These areas of deficiencies have included teaching skills, obstetrics, office gynecology, dermatology, ambulatory surgery, orthopedics, pediatrics, and office management.

Limited previous practice and/or academic experience—The desirability of a solid experience in the delivery of patient care for a teacher of primary care seems self-evident. Perhaps less obvious in the setting of a community-based medical school is the equally important desirability of a preparation in academic medicine. Primary care can and has been taught through medical school subsidized preceptorships utilizing private practitioners. Opportunities are already abundantly available to the clinician interested in combining a lucrative private practice with limited teaching experiences in primary care. If competent primary care physicians are to be attracted into full-time academic positions, such positions must offer something more than what is already available in the private practitioner-preceptorship model. They must have protected time for research and other scholarly activities. Appropriate areas for research in primary care must be developed, and this requires a faculty with a solid background in the scientific method and investigative activities.

The high cost of experienced practitioners—The traditional salary level for full-time academicians is not adequate for experienced primary care physicians. A minimum annual salary of $55,000 with liberal fringe benefits is necessary to attract mature board-certified primary care physicians from private practice into full-time academic positions.

Integration of multiple roles—Just as the full-time academician in a traditional medical school has had to juggle his time and energy among teaching, research, patient care, and administration, the primary-care-teacher–physician in an academic setting is confronted by the necessity of integrating these and other functions. He not only must demonstrate excellence as a role model in ambulatory care but also must possess competence in the management of hospitalized patients. In addition, he faces the logistical problem of staffing a rural office from 8:30 A.M. until 5:00 P.M. 35-miles from a hospital. There has been a potential "second class citizen syndrome" because of the difficulty many of the CHC faculty have had in finding adequate time to interact with Rockford physicians in a hospital setting.

Conclusions

Although it is still too early to draw definite conclusions about the successes or failures of the Rockford experience in undergraduate primary care education, the following tentative conclusions based on the four years this program has been operational are offered.

1. The curricular design for a successful undergraduate program in primary care ideally must be a continuous, longitudinal experience for the student. This, in turn, require the total commitment and cooperation of the administration and, especially, of the remainder of the faculty. While theoretically possible to achieve in older, established institutions, such undergraduate curricula are more easily implemented in new developing community-based medical schools.

2. The Community Health Center Program appears to represent a viable primary care educational model. Three

spective of any effect it may prove to have on the ultimate career choices of the students, the program has proven to be eminently worthwhile on the basis of its educational and service merits alone.

3. Patient acceptance of medical student involvement in ambulatory care has been excellent. The additional time taken by the student in performing relatively routine clinical tasks is viewed by the patient more often as a positive rather than a negative feature. A predetermined effort must be made to achieve and to maintain a satisfactory balance between the health care demands of a community and the educational requirements of the medical school. This is especially critical in the area of primary care where consumer demands may seem at times to be inexhaustible. The educational mission of the medical school must never be buried by overcommitment to service demands.

4. The financial assumption upon which the Rockford CHC program has been built has proven to be correct, at least in the short run. Given 90 percent of faculty salaries paid for by budgeted monies, the remainder of the costs—both capital and operational—has been adequately met by funds generated from patient care on a fee-for-service basis. However, in the long run this financial arrangement may prove undesirable. Pressures to increase income, not only to meet daily overhead expenses but also to cover capital costs, may mount and act as a deterrent to teaching and to faculty development. Sources other than patient fees should be utilized for capitalization costs in order to avoid undue financial pressures on the faculty. The parent institution must recognize and reward excellence in the practice and teaching of primary care by specifically budgeting sufficient money for such individuals.

5. Training programs must be developed and adequately funded for the education of future faculty members in primary care. Faculty in primary care who combine both clinical and teaching skills with investigative interest and talents will be in scarce supply for the next decade. As the dual process of producing both practitioners and teachers of primary care continues, the scope and breath of this function will be better defined.

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The Myth of Professional Isolation Among Physicians in Nonurban Areas

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Abstract—Forty-six physicians practicing in nonurban areas of California were interviewed. A majority reported that they rarely or never felt professionally isolated. Measures describing the current community and professional activities were not found to predict feeling of professional isolation. The only background variable found to be significantly related to feelings of professional isolation was mean rating by admissions interviewers. It was concluded that applicants with high ratings were more likely to acquire a strongly academic, research view of medicine and, as a result, to feel professionally isolated when practicing in nonurban areas.

Fear of professional isolation has been cited as one of the factors preventing physicians from settling in nonmetropolitan areas. Castleton (1), for example, enumerates several factors which he believes to be causes of the shortage of doctors in rural areas, including the inadequacy of hospital facilities and equipment and the lack of opportunities for professional education, both of which he assumes to be important considerations to physicians looking for a place to settle. And, in fact, there is evidence that such factors are important to young physicians. Taylor, Dickman, and Kane (2) found in their sample of 202 students from medical schools in western states that regardless of where they planned to settle later, they indicated a need for opportunities to keep current, opportunities for professional consultation, and access to adequate hospital facilities.

Heald, Cooper, and Coleman (3) found that among the factors in choice of location most frequently checked by the 1,161 primary care physicians in their sample of recent medical school graduates were professional considerations such as availability of clinical support facilities and personnel, opportunity for regular personal contact with other physicians, opportunity for regular contact with a medical school or medical center, and access to continuing education. Urban physicians emphasized these professional considerations more frequently than rural physicians. On the basis of their findings, the authors concluded, "The suggested lack or inadequacy of such supportive institutions in rural areas points to the need for programs that free rural physicians from professional isolation."

This paper is based on a program of research on medical education, choice of specialty, location of practice, and related issues being carried out at the Institute of Personality Assessment and Research, University of California, Berkeley, under a grant from the Robert Wood Johnson Foundation.

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For related editorial, see page 1008.

Results of studies of physicians already in practice also indicate that they believe that these factors are important determinants of location choice and, therefore, deterrents to settling in rural areas. Champion and Olsen (4) report that when asked to identify those factors that would detract from the attractiveness of Appalachian medical practice, 106 physicians in both metropolitan and nonmetropolitan areas of southern Appalachia most frequently cited the inadequacy of medical facilities, including modern hospitals, equipment, and "general medical paraphernalia" as the primary disadvantage.

In a survey of physicians in metropolitan and nonmetropolitan areas in western New York state, Parker and Tuxill (5) found that both of these groups of physicians felt that among the most important factors preventing physicians from locating in small communities were the belief that small communities lack complete medical facilities and the desire to practice near a large medical center. Physicians in this sample who were practicing in large communities rated these same two factors as important in deterring them personally from locating in small communities.

There is little evidence about the actual feelings of doctors in practice in nonurban areas; however, Bible (6) in his survey of 1,853 physicians in private practice in nonmetropolitan areas found that while access to continuing education programs, medical facilities, consultative services, facilities for handling emergencies, and hospitals and opportunities for professional growth were considered to be problems in these areas, the frequency with which these were cited varied with the size of the community in which the doctors practiced. They were seen as liabilities significantly more often for the most isolated rural communities than for larger communities closer to metropolitan areas. However, in every group they were cited as drawbacks by less than half of the respondents.

Because professional isolation is believed to be an inevitable consequence of rural medical practice and fear of professional isolation seems to be a factor in discouraging some physicians from locating in nonmetropolitan areas, it is important to determine the actual prevalence of this feeling among physicians practicing in nonurban areas and to explore the characteristics, both of the communities and the physicians, which are related to it.

Method

This investigation is based on data from physicians who are currently practicing in nonurban areas of California. It is part of a larger study (7) initiated in 1950 of 1,195 medical students, 1,061 males and 134 females, of whom 1,087 eventually took M.D. degrees at the University of California, San Francisco, School of Medicine and 48 at other schools. These physicians are now being seen in a follow-up research program that began in 1972. A follow-up questionnaire was sent to the 1,135 graduates, of whom a total of 903–802 males and 101 females–returned completed forms. Gough and Hall (8) investigated the relationships of 128 background, performance, and personality measures to willingness to reply to this questionnaire and found 12 significant differences. These differences were small in magnitude and nonincremental, and, therefore, differences between respondents and nonrespondents were concluded to be minimal and unbiasing. The subgroup of 46 on which the present report is based represents all those male physicians from the follow-up sample now practicing in nonurban areas of California who indicated on the questionnaire that they were willing to be interviewed.

Half of the physicians in this sample graduated from medical school after 1964, and a majority were under 36 years old at the time of the interview. Most had been practicing in their present communities for less than three years. Classifying the fields according to the American Medical Association system (9), the most prevalent field represented was family practice (34.8 percent), followed by surgical specialties (32.6 percent), medical specialties (13.0 percent), and other fields (19.6 percent), including psychiatry, radiology, and otolaryngology.

Solo private practice was the most common type of practice (39.1 percent), followed by group practice (30.4 percent) and partnership and institutional settings (each with 15.2 percent). Most often these physicians practiced in communities in the 10,000 to 30,000 range (34.8 percent), followed by 2,500 to 10,000 (26.1 percent) and 30,000 to 50,000 (21.7 percent). Four physicians were in communities of less than 2,500, and four were in communities of more than 50,000 but less than 60,000.

Information on current professional activities and on feeling of professional isolation was obtained from interviews conducted by the investigator in 1974 and 1975. These interviews usually took place in the doctors' offices and lasted an hour or more. Information on premedical variables, medical school performance, and background was obtained during earlier periods of the project.

Results

Within this sample of nonurban physicians, professional isolation was not perceived as a major problem. A majority of the physicians, 56.5 percent, reported that they never felt professionally isolated, 6.5 percent that they rarely did, 28.3 percent that they sometimes did, and only 8.7 percent that they often did. On a four-point scale, with one signifying never, two rarely, three sometimes, and four often, the mean score for this group was 1.89; and the standard deviation was 1.10.

The comments of the physicians who reported that they occasionally felt professionally isolated usually indicated dissatisfaction with a specific aspect of the medical environment, for example, absence of a regular lecture series, a journal club, or adequate hospital facilities. Some had more general complaints. A general surgeon who had only recently finished his training reported, "I miss the medical center: rounds, stimulation, and so forth." Others felt limited because of their specialties or the types of practices they had. A general surgeon who had just set up practice and still did a lot of general practice replied, "I mainly miss doing the operations that I was trained to do and can't do here because of the equipment. I also get lonely when I have a problem that I can't get an immediate consult for." A general practitioner who worked in a county clinic reported, "I feel professionally isolated to the extent that the service I provide is limited. There's not much breadth to it. But I don't feel that I lack access to other doctors and facilities."

Some of the physicians who reported that they rarely or never felt professionally isolated mentioned similar problems but indicated that they were taking steps to deal with them or that they did not see them as serious drawbacks to practice in their areas. An internist said, "We have all the specialties here, and I spend a lot of time at a hospital in San Francisco learning the most recent techniques." A general practitioner who had been in practice over 10 years explained, "That's

why I take continuing education courses. But I don't feel isolated to a large degree, due to modern communication. Time is my main problem, not isolation." A young internist noted, "I feel isolated a little bit, but not enough to fret about. When I go back to the medical center I feel wise. I know what it's like to be a doctor rather than just a teacher."

SATISFACTION WITH SERVICES

A majority of the physicians in this sample voiced satisfaction with the services and facilities available to them. In fact, 65.9 percent of these physicians were either satisfied or very satisfied with their hospital admitting privileges, and 84.1 percent expressed the same degree of satisfaction with their own office facilities.

However, a somewhat lower level of satisfaction was expressed with opportunities for keeping up professionally. When asked how they kept up, they reported the three most important ways to be: reading the professional literature; attending professional meetings, courses, and conventions; and conferring with professional colleagues. Although they rarely experienced outright dissatisfaction, only 47.7 percent reported that they were either satisfied or very satisfied with the opportunities for continuing education available to them, and only 37.5 percent reported these levels of satisfaction with their opportunities for professional contacts.

PROFESSIONAL ACTIVITIES

A series of statistical analyses was carried out to see whether individual differences in feelings of professional isolation were related to certain current and background variables. Table 1 presents the correlations of the 33 variables investigated with the four-step scoring of "feeling of professional isolation." Most of the information is based on all 46 cases, with certain exceptions noted in the table. Because medical school grading systems changed during the 25 years of the project, grade-point averages were converted to standard scores by year and class, with a mean of 50 and a standard deviation of 10 for each. The clinical and academic performance factors are derived from a factor analysis of grades and faculty ratings reported earlier (10).

Work environment would seem to be an obvious beginning point in attempting to understand the factors which are related to feelings of professional isolation among nonurban physicians. However, neither the populations of the communities and counties, the number of nonfederal physicians in patient care in the counties, nor the number of hospital beds in the counties (11) was significantly related to feeling of professional isolation.

The time the physicians have available to utilize these resources and the extent to which they actually participate in continuing education, as measured by current professional activities, were not found to be significantly related to feeling of professional isolation either. The correlations with frequency of informal meetings with professional colleagues and number of hours worked per week approached significance, suggesting that physicians who met more often with their colleagues and who worked more hours felt less isolated professionally.

Using chi-square tests, the author also determined that feelings of professional isolation were not associated with type of practice (solo, group, partnership, or institutional) or with field of practice (family practice, medical specialty, surgical specialty, or other).

BACKGROUND MEASURES

The next three sets of measures had to do with background, aptitude, and past

TABLE 1

CORRELATIONS OF PROFESSIONAL, BACKGROUND, AND ACADEMIC VARIABLES WITH FEELING OF PROFESSIONAL ISOLATION FOR A SAMPLE OF 46 NONURBAN PHYSICIANS

Variables	*r*	Variables	*r*
Current community		Premedical performance	
Population of community where practicing	−0.9*	Medical College Admission Test	
Population of county where practicing	−.06*	Verbal ability	.05
Number of nonfederal physicians in patient care in county	−.12	Quantitative ability	.26
Number of hospital beds in county	.11	General Information	.16
Current professional activity		Science	.13
Number of hours worked per week	−.27	Premedical grades	
Number of journals read regularly	−.09	Overall	.07
Number of articles read per week	.19	Scientific subjects	.03
Number of continuing education courses attended per year	−.07	Last two terms	.13
Number of conventions attended per year	.04	Mean rating by admissions interviewers	.35†
Number of teaching and training activities	−.07	Medical school performance‡	
Number of professional memberships	−.07	Medical school grades	
Frequency with which meet informally with professional colleagues	−.28	Year 1	.05
Background		Year 2	−.11
Population of community where grew up	−.18*	Year 3	−.23
Current age	−.13	Year 4	−.14
Year of medical school graduation	.05	Cumulative	−.13
		Faculty ratings	
		Clinical competence	−.09
		General competence	−.02
		Total	−.12
		Clinical performance factor	−.14
		Academic performance factor	−.09

* Correlations computed using the logs of the populations.
† Ns range from 40 to 44.
‡ $p \leq .05$.

performance. Neither the population of community where the physician grew up, current age, nor year of medical school graduation was found to be significantly related to feeling of professional isolation.

Only one premedical variable, mean rating by admissions interviewers, was significantly related to feeling of professional isolation, with a Pearson product-moment correlation coefficient of +.35, meaning that doctors who were given the highest ratings as medical school applicant felt more professionally isolated when they practiced in nonurban settings. This is an unexpected finding because the admissions interview has very seldom been found to correlate significantly with other variables used in the study of medical students and doctors (7, 12–14). None of the relationships between the rest of the premedical and medical school performance measures and feeling of professional isolation was statistically significant.

A stepwise multiple regression analysis was done to obtain the best combination of factors to predict feeling of professional isolation among this sample of nonurban physicians. However, none of

the other variables adds significantly to the predictive power of mean ratings by admissions interviewers, which had the highest first-order correlation. Thus, it appears that with the exception of admissions evaluations, prior data have little predictive consequence with regard to feeling of professional isolation.

ATTITUDE TOWARD ACADEMICS

In order to gain additional insight into these nonurban physicians' attitudes toward their work, it might be useful to examine how they answered a related question in the interview. The majority took exception to the following statement: "It is sometimes said that doctors who are out in practice, rather than in academic settings, just can't keep up with the field and, therefore, don't practice as good medicine." The most frequent response, given by 45.7 percent of the doctors, was that it was true of some doctors but not of all and that it depended on the individual. For example, a general surgeon replied, "It's up to the individual. If doctors make an effort, they can keep up. Some people in academics rest on their laurels and don't continue to contribute." A general practitioner explained, "The medicine practiced in this community is excellent. We keep up. We have to. We're on our own and can't be covered as well. At times we keep up more – out of necessity."

The second most frequent response, given by 28.3 percent of the doctors, was that while it may be true that some doctors do not keep up as well, it really is not important. An example of this type of answer, given by a general surgeon, is: "The single most important factor in patient care is to give them the time and attention needed. The latest knowledge is only secondary. Major changes in knowledge come rarely. A sense of responsibility is the most important thing." A general practitioner voiced a similar opinion: "Good medicine that can be practiced in universities is different from medicine that can be practiced in the front lines. Academic medicine requires limitless facilities. For most people the personal touch is what makes medicine good. Doctors can do a good job if they keep in touch with people."

TWO PHYSICIANS

Following are short descriptions of two physicians who represent different degrees of the feeling of professional isolation and different attitudes toward their work and communities.

Dr. A is a solo family practitioner in a medium-sized town where he has been working for over five years. He came to this community after completing his residency because he was looking for a quiet, friendly place where he could raise his family and practice the type of medicine for which he was trained. To him this meant a community that was sufficiently large to assure enough work but small enough to discourage competition by specialists. He now has a thriving practice of which he is proud. He is very interested in maintaining good rapport with his patients and tries to limit the number of new patients he sees so that his practice will not grow out of control. He is involved in a variety of teaching and training activities both in his office and in a nearby urban medical center, and he is able to arrange coverage by a colleague so that he can get away for at least two weeks of educational leave per year. Dr. A never feels professionally isolated. He is satisfied with all aspects of his practice and has no serious complaints about it or life in his community.

Dr. B is in solo family practice in a small farming community over 50 miles from the nearest medical center. He grew up in this community and decided to return after his training because the local doctors persuaded him that he was needed there. He planned only to stay temporarily; but over the years he settled into the life of the community, buying a ranch, becoming involved in civic activities, and building a busy practice. Now, after over 10 years of hard work, he is tired and disillusioned. He feels trapped by the constant demands and unrelenting responsibilities of his practice which make it difficult for him to get away with his family for even a weekend. He has tried several times to get a partner, always unsuccessfully. He is also unhappy with the local medical community and is critical of many of their practices and policies. Dr. B is dissatisfied with several aspects of his own practice and often feels professionally isolated. He is thinking about leaving the town when he feels that he is financially able to take a lower paying salaried position.

Discussion

It is encouraging to find that not all physicians practicing in nonurban areas feel professionally isolated. Of course, the sample is composed of a small number of physicians, younger than the national average (11) and for the most part not practicing in extremely small, isolated communities. Nonetheless, it does represent a group of physicians working outside major metropolitan areas who are not dissatisfied with their professional lives and do not feel alienated from the mainstream of medicine.

These physicians have adjusted to their situations and have made the most of the opportunities available to them. Because many sources of continuing education are not as readily available to them as to their urban colleagues, they have learned to make more determined individual efforts and to accept greater inconveniences in order to keep current professionally. This means listening to audiodigest tapes while driving to the office or the hospital, organizing journal clubs and conferences at local hospitals, and sometimes driving long distances to attend grand rounds and courses at far-away medical centers.

These physicians have also adapted to the realities of a high volume of patients and a limited scope of supporting services and facilities and have accepted different concepts of what constitutes good medicine. This has involved a shift in attitudes and values, with less emphasis being placed on the importance of the most recent academic knowledge and greater emphasis on the importance of the doctor-patient relationship and the satisfactions which come from it. This change is often accompanied by a shift in attitudes toward colleagues: they look to their local medical communities rather than to the distant medical centers – where they were educated and trained – for both formal and informal consultations.

The finding of a positive relationship between feelings of professional isolation and mean admissions interview rating suggests that those physicians who, as applicants, were considered to be most desirable by the medical schools possess characteristics which make it difficult for them to make these adjustments. From work on a sample of medical school applicants involved in the larger longitudinal study (15), it may be inferred that applicants with very high ratings tend to share values of the medical school faculty, and, therefore, will be likely to acquire a strongly academic-research view of medicine. As a result they may subsequently find their work in small communities, away from major teaching and research centers, somewhat frustrating. Since the admissions interview has not often been found in the past to correlate significantly with other variables,

an attempt should be made to replicate this finding.

Conclusions

The major implications of these findings are these:

1. Professional isolation is not inevitable in nonurban communities.

2. Background measures do not predict feelings of professional isolation; therefore, it is not a kind of person who feels isolated but more likely a real set of circumstances which lead to a feeling of isolation.

3. Orientation to medicine, as presaged by admissions ratings, is a factor in feelings of professional isolation.

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COMMUNICATIONS

The 'One-and-Two' Program: A New Direction In Family Practice Residency Training

John P. Geyman, M.D.

As increasing experience has been gained with graduate education in family practice in the past eight years, it has been recognized that programs of high quality can be developed in varied settings and through different approaches. An important new concept in family practice residency training is the affiliated program involving two separate communities.

Family practice residency programs until recently have been entirely based on the original "Essentials for Family Practice Residency Training," drafted in 1969, which called for three years of continuity of care and training in one community. These essentials are now in the process of revision. The current draft of the essentials, revised in 1976 by the American Academy of Family Physicians, is supported by the major organizations in family practice and opens the door to the "one-and-two" program (that is, a program involving a larger teaching hospital for the first year and a smaller community hospital for the second and third years) through the following statement: "Because of the importance of experience in the continuity of care afforded in the Family Practice Center, it is highly desirable that all residents in family practice have at least two consecutive years in the Family Practice Center of one institution."

Jason (1) has stressed the importance of designing medical education programs which are highly relevant to medical practice and which prepare the student (resident) for the demands and style of his future practice. These requisites can be met by many smaller community hospitals whose clinical and/or educational resources may not be sufficient to mount a full three-year program. At the same time many large teaching hospitals can provide an excellent first graduate year's experience but cannot match the relevance and learning potential for the subsequent two years of a family practice residency. A strong case can be made for the value of an intensive first graduate year in a large teaching hospital with active interchange with other specialty house staff.

The supply and geographic distribution of physician manpower in the late 1970s are quite different from past years. An increasing number of physicians trained in the various subspecialties are now entering practice in smaller communities, and this trend can be expected to progress further in this direction. In addition, the sophistication of medical facilities and services in even the smaller community hospitals (100 to 300 beds) has steadily increased in recent years.

Family practice residency training is particularly suited to decentralization. Primary and secondary levels of care provide excellent settings for family practice teaching. Family practice will also be more effective in meeting physician manpower needs in shortage areas if programs are decentralized to smaller communities (2, 3).

Program Description

A prototype of a one-and-two family practice residency program has recently been described (4), together with a related regional network for family practice residency training involving a medical school and affiliated community hospitals (5). In the past two years a number of additional one-and-two programs have been developed in California, Washington, Colorado, Iowa, and other states.

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Although these programs vary somewhat according to the needs and resources of each setting, the following description of a curriculum will illustrate the organization of a typical program. The first year is entirely based in the larger teaching hospital, with the exception of a one-month family practice rotation in the affiliated smaller community setting. This rotation stresses the principles of family medicine and provides an introduction to the resident's future base which helps to facilitate the resident's transition at the end of the first year. The remaining 11 months of the first year are devoted to teaching rotations in internal medicine, pediatrics, obstetrics-gynecology, surgery, and emergency medicine. Additional teaching rotations in these fields are conducted in the affiliated smaller community hospital during the second and third years of the program, together with other teaching rotations in ambulatory settings in the community. The typical three-year curriculum includes the following: general internal medicine and medical subspecialties, 12 months; pediatrics, 4 to 6 months; obstetrics-gynecology, 4 to 6 months; general surgery and surgical subspecialties, 6 months; emergency medicine, 2 months; psychiatry, 1 month; and electives, 3 to 7 months. Additional training in behavioral science is provided as a longitudinal experience throughout the second and third years of the program.

First-year family practice residents in a one-and-two program may be involved in a family practice center (for example, one-half day per week) if the larger teaching hospital has its own family practice residency program. The major continuity of care experience, however, will be in the family practice center related to the affiliated community hospital.

Clearly, the planning, organization, curriculum development, operation, and evaluation of a one-and-two family practice residency program requires the continuing, close cooperation of the faculty and staff of both hospitals.

Advantages

Organization of a family practice residency program on a one-and-two basis has the following advantages:

1. Creates an attractive blend of residency training for those family practice residents desiring a combination of experiences in larger and smaller community settings.
2. Affords "reality-based" educational experiences in smaller community settings without the resources needed for a full three-year program.
3. Utilizes the potential teaching resources increasingly available in smaller communities in all specialties.
4. Facilitates new regional linkages between primary, secondary, and tertiary care resources.
5. Provides an effective approach to help meet physician manpower needs in areas distant from the medical school.

Comment

Although there are attractive advantages to the one-and-two family practice residency programs in some appropriate settings, it must be recognized that special problems are involved in the implementation of this concept. The following principles are pertinent in this regard:

1. Careful ongoing coordination is required among faculty members, program directors, and institutions in the two related locations.
2. Special efforts should be taken to assure the first-year resident's identity as a family practice resident and his orientation to the ultimate location of the program in a community hospital.
3. The minimum "critical mass" should be four residents in each residency year.
4. Evaluation of resident training in each location of the program, as well as in the total three-year program, must be given high priority to assure the quality of the educational experience.

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Pao's Selection Method for Quality Papers And the Subsequent Use of Medical Literature

Bert Boyce, Ph.D., and Karen Primov

The "quality filter" selection method proposed by Pao (1) is based on the bibliographies of literature review articles and essentially selects as key information sources for students in particular medical subjects those papers which are most cited by reviewers of the subject in a three-year span. The question of concern here is whether or not Pao's method permits the selection of papers which not only are of use to medical educators but also are likely to be of use to researchers. Should this be the case, the papers become even more valuable as educational tools and also as indicators of the future directions of research.

The most straightforward way to confirm the extent of the use of articles selected on the basis of frequency of citation in review articles is to check their citation patterns in the general literature. While it may be questionable whether or not subsequent citation is a measure of a paper's quality, it is surely a measure of its use by citing researchers. Thus, it would seem that a comparison of the number of times a paper selected by Pao is cited with the average number of times that paper is cited by authors in the same discipline will clearly demonstrate whether or not she is selecting the papers which will be subsequently most used by workers in the field.

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Methodology

The 14 most significant papers on drug therapy for arrhythmias which Pao selected in her original work had publication dates ranging from 1963 to 1968; therefore, this same time period was originally considered for a list of articles written on the same topic to be compiled utilizing *Index Medicus* and its computerized counterpart MEDLINE.

In order to find articles on the same topic, the controlled vocabulary for *Index Medicus* (that is, Medical Subject Headings, or MESH) was consulted to determine the appropriate subject headings. This check showed that there were two applicable terms—Arrhythmia and Arrhythmia, Sinus; however, the subheading "Drug Therapy" was not used until 1966. Since the articles listed in *Index Medicus* under these two subject headings for the years 1963–1965 were not subdivided, it was impossible to be sure which articles referred to the aspect "drug therapy" without consulting a subject expert. Therefore, the articles listed in *Index Medicus* from 1963 to 1965 were not selected for use as the sample. This necessitated the elimination of the eight articles of Pao's original 14 published before 1966, since it was considered to be important to compare citation patterns for articles written on the same topic published in the same time period. Therefore, the citations to the six papers selected by Pao which were published from 1966 to 1968

were compared with the citations to the 177 papers provided by the *Index Medicus* search for the same period. The citations to each paper in both samples were counted for its year of publication and for the seven following years.

Results

Citations to the 177 papers varied from 75 (42 percent) uncited to one cited 131 times; 83 percent of the uncited papers originally appeared in non-English journals, but only 42 percent of papers receiving one or more citations were found in these journals. Because from a total of 1,249 citations only 25 self-citations were noted, this factor was considered negligible in evaluating the results. The average number of times cited for articles in this sample was 7.03, or ignoring the uncited papers 12.25.

The frequency of citation of Pao's six primary articles varied from 41 to 130. Again the factor of self-citation was negligible since only six of a total of 404 citations fell into this category. The average number of times cited for this sample was 67.33.

While the results clearly show the articles selected by the quality filtering method are, on the average, cited far more times than other articles, these results also show that the quality filtering method will not always include all the articles highly cited by the general scientific community. For example, four articles of the sample of 177 articles were cited more than 67 times, that is, more often than the average number of citations received by the sample of Pao's primary articles.

Nonetheless, the quality filter method seems most effective in selecting papers which will be highly cited in future work and thus seems as well suited to researchers as to educators and students. It provides the librarian with a tool for forming a highly selective bibliography in a particular medical literature without need for subject expertise.

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The Portable Patient Problem Pack: A Problem-Based Learning Unit

Howard S. Barrows, M.D., and Robyn M. Tamblyn

The Portable Patient Problem Pack (P4) is a method of simulating a patient's problem in a card deck format. It allows the student to take any action possible with the real patient in the sequence he feels is appropriate. As in the real clinical situation, the student is able to see the result of each action before deciding on the next. With this format he is challenged to evaluate and manage appropriately the patient's problem. He is as free to make mistakes, perform unnecessary tests, and order incorrect treatments as he is to manage effectively the problem presented.

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Purpose

The P4 has been carefully designed to develop the student's problem-solving or diagnostic skills in a manner consistent with the skills of the practicing clinician that have been characterized by recent studies (1, 2). It is a portable, easily usable format that requires only a table top without the burden of complex hardware. In his interaction with the P4 the student is able to observe and interpret X-rays, electrocardiograms, funduscopic appearances, histological specimens, and other items he may request in his work with the patient's problem.

The simulation format can be used for any of a variety of educational purposes: to develop the student's cognitive skills of problem-solving or clinical reasoning, to facilitate problem-based learning as an active educational process for acquiring both basic sicence and clinical knowledge and concepts related to the problem presented, to encourage the development of self-directed study skills, and to evaluate the student's clinical problem-solving skills in effectively assessing and managing a specific patient problem. The P4 may be used by individual students, small groups, or a class.

A scoring system is incorporated to evaluate the student's clinical reasoning or problem-solving skills and the cost of his evaluation of the patient. Additional materials are provided to help both faculty and students using this format evaluate further the student's clinical reasoning, patient management, and fund of background knowledge.

Description

The complete P4 unit, simulating one patient problem, consists of a deck of 280 three-by-five inch cards in a variety of colors, a collection of 35 mm slides, printed instructions, and evaluation materials. Colors categorize the type of action that can be taken with the patient—white cards for questions on history, blue for items on physical examination, orange for investigations, green for consultants, and pink for all possible treatment or management interventions. On the front of each card, at the top edge, the specific action that the card represents is described in capital letters. Below this title the fronts display a series of questions that the student should ask himself—until it becomes automatic—before selecting any cards of that color. These questions are designed to help shape the effectiveness and efficiency of the student's problem-solving or clinical reasoning skills. Cards for actions such as investigations and consultations may have a number on the front that indicates the time delay involved in obtaining the result of that action in the real clinical situation.

The backs of the cards give the student the responses to the action indicated on the front, answers to questions, findings on physical examination, results of investigations, opinions of consultants, and results of intervention that actually occurred with the patient on whom the simulation is based or would have occurred if such action had been taken. Some of the backs refer the student to appropriate slides of X-rays, funduscopic views, and laboratory or diagnostic tests for the student to observe and interpret. The interpretation of these materials is printed upside down on the card back to prevent accidental perception until the card is deliberately inverted by the student after he has made his own observations.

Other cards are designed to facilitate the student's interaction with the problem and evaluation of his performance. The "situation" card initiates work with the problem. When turned over, it describes where the patient presents himself—emergency room, office or clinic—and offers a brief statement of the presenting problem. The "closure" card is selected by the student to signify that he is finished, an important decision that all clinicians must learn to make. After he has drawn this card, no further cards can be drawn. The back side of this card asks a variety of questions the student should be able to answer if he had appropriately evaluated and understood the patient problem as presented. A separate series of "patient progress" cards allows the student to subsequently follow the patient's problem, over time, in the manner of a problem box or sequential management problem (3, 4).

There are many times more actions or cards available in each deck than are necessary or even relevant to deal with the particular patient problem presented. The 280 cards and their titles remain constant in different decks, each simulating a different patient problem. This minimizes the effect of cueing in a specific patient problem as every card is

always present whether useful or not. The fronts of the cards and their numbers cannot differentiate one patient problem from another. However, the backs of the cards, representing the response of the particular patient, are, of course, different for each deck.

To work with the unit, the student spreads the cards out in front of him so that all the titles can be seen, reads the back of the situation card, and acquaints himself with the problem. He determines which action he should take first, draws the appropriate card, reads the result, and then decides on his next action as he would with the real patient. He continues in this manner until he has decided that he has handled the problem as far as he can or wishes to. If the unit is being used for problem-based learning, the student may stop at any time to read, study, or confer with faculty before continuing with the deck. As he continues to work with the deck, he puts each card drawn in a pile on top of the previous cards he has chosen. At the end, the pile of cards represents his cognitive path and can be used for a variety of approaches to evaluation.

Effectiveness

This format was developed from several years of experience with the "problem box" format (5). The educational advantages of the P4 in problem-based learning has led to its use in a wide variety of areas at McMaster University Faculty of Health Sciences for both learning and evaluation. Students find the P4 motivating because it exposes deficiences in their thinking processes and knowledge base which interfere with their abilities to deal with the patient problem. On the basis of his carefully analyzed work with a more limited card format, Rimoldi (5) indicated that the "dynamic aspect of the diagnostic process" could be objectively explored and it could be used to train the student in the skills of diagnoses. The experience of faculty members using the P4 with a variety of students has underlined this observation. They have found this format to be an effective problem-based stimulus for student learning in both the clinical and basic sciences.

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A Podiatric Medical Residency Program In an Academic Health Science Center

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As a result of the knowledge explosion experienced throughout the health and scientific communities, podiatric medical education has undergone a major metamorphosis. After a relatively short modern history, the field of podiatric medicine has evolved to a point where its education and training is a microcosm of its sister profession of medicine. For example, in addition to preprofessional requirements that are identical to those demanded for entrance to medical school, students who are able to successfully compete for a first-year place in one of the five colleges of podiatric medicine are expected to complete a basic science curriculum equivalent to medical school. It is only the clinical curriculum of colleges of podiatric medicine which completes the four-year doctoral program that differentiates it from medical school.

As the knowledge base in the profession expanded, therefore, it was logical that postdoctoral residency training would begin to evolve and gain popularity. Another important reason for its evolution was the inclusion of podiatric medicine in the standards of the Joint Commission on Accreditation of Hospitals in 1970, which provided clinical privileges to podiatrists (1). The recognition of podiatrists as members of the house staff of hospitals in the same manner as medical doctors and dentists in the 1976 *Accreditation Manual for Hospitals* already appears to be having an impact on the establishment of even more podiatric medical residencies (2).

Podiatric medical residency programs range from one to three years in duration. Hospital based, they usually emphasize either podiatric surgery or provide a rotating program in general and podiatric medicine and surgery. Because of the fact that until very recently podiatrists had considerable difficulty obtaining staff privileges in hospitals and that the existing podiatric medical colleges are all nonuniversity, free standing institutions, most podiatric medical residencies are situated in smaller hospitals in which there are usually few, if any, other residency programs.

Exceptions to this are beginning to occur, and it is reasonable to assume that an increasing number of residencies in podiatric medicine will be established in teaching hospitals throughout the nation as podiatrists continue to acquire privileges in these centers. Despite the fact that postdoctoral training is required to obtain licensure in only a few states, 93 percent of all podiatric medical graduates in 1976 sought entrance into such a program. Unlike medicine, however, with more house staff positions than medical school graduates, only 50 percent of those who sought a residency in podiatric medicine were successful in obtaining one; this is despite the fact that the number of first year residency places between 1973 and 1976 rose by 223 percent, and the increase is even more dramatic if one goes back just a few more years. Hence, it is clear that there is a well-established trend in podiatric medicine for the completion of at least one year of residency prior to entering practice (3–4).

Description

The podiatric medical residency program in the University of Texas Health Science Center at San Antonio began five years ago in what was then the Division of Ambulatory Care of the Department of Medicine. No funds were available at the time, but a small grant of

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approximately $5,000 from the Texas Podiatry Association provided the seed money to begin the program. The following year additional monies were raised from a pharmaceutical company, professional supply house, and local foundation as well as from the proceeds of a scientific program. By the fourth year, however, the state of Texas provided stipends for two residents in its biennial budget. Today, there are three state-funded podiatric medical residents, and as of the beginning of the 1977 academic year support was also provided for a half-time podiatric medical faculty member. Up to that time the podiatric medical faculty had been participating in the program on a voluntary basis.

The podiatric medical residency is now a component of the Department of Family Practice in the School of Medicine of the Health Science Center at San Antonio. The Department of Family Practice, along with the Podiatry Service, is located in the Robert B. Green Hospital. One of the residents is always on call at Green, where a busy podiatric medical clinic is in operation three days per week.

During the month of July the residents attend the Medical Follow-Up Clinic which helps them get acquainted with the operation of the entire health care program at Green. Medical Follow-Up is a service of the Department of Family Practice. In August one of the residents is assigned to the Dermatology Department, rotating through Brooke Army Medical Center, Bexar County Hospital, Wilfor-Hall Air Force Hospital, and the Audie Murphy Veterans Administration Hospital. The resident who remains in the Podiatry Service at Robert B. Green is also assigned to the Oncology Clinic on Wednesday afternoons. In September the residents rotate to the Physical Medicine Department of Brooke Army Medical Center and become familiar with electromyographic studies and the approach of the physiatrist to patient problems. The next assignment is in the Department of Orthopedic Surgery at Brooke Army Medical Center, where they are on call 24 hours a day, obtaining experience in trauma, surgical foot care, and a multi-disciplinary approach to a number of orthopedic problems. In the fifth month of the program the residents are assigned to the Department of Neurology. Under the supervision of the senior resident, they participate in the management of neurological patients at Bexar County Hospital. Another required rotation is in the Department of Anesthesiology in the county hospital, where residents learn to monitor patients postoperatively, start I.V.s, intubate, and participate in the induction and monitoring of the anesthetized patient under the supervision of the anesthesiologist. Each resident also spends a month in the emergency room observing and participating in the management of acute medical and surgical emergencies in the busy emergency service of Robert B. Green Hospital.

Podiatric outpatient surgery is performed weekly at Robert B. Green Hospital. Operating room surgical experience is received at Brooke Army Medical Center in the Orthopedic Surgery Department as well as in the Podiatry Service of that department for one month. The residents are required to attend conferences and rounds conducted by the departments in which they are rotating as well as those held by the Podiatric Medical Service.

Discussion

The podiatric medical residency program in the Health Science Center at San Antonio provides an intensive exposure for the newly graduated podiatrist to practice in a multidisciplinary environment. In addition to having an opportunity for a year of advanced clinical training in preventing, diagnosing, and managing podiatric pathology, residents also become more familiar with general medical and surgical diseases and disorders. This is particularly useful in improving their understanding of the many systemic diseases and disorders which have manifestations in the lower extremities, such as diabetes, heart and peripheral-vascular diseases, renal disorders, arthritides, postcerebrovascular accidents and other neurological problems, and neoplasia. In addition, the training is of great benefit in improving the residents' skills in the management of podiatric patients who may also be under concurrent care by another physician for some unrelated condition. For example, the approach by the podiatrist to a patient with an acute foot infection who also is under treatment by an internist for some form of cardiac arrythmia might be different if the same podiatric patient were a healthy adolescent. Of equal importance, however, is the opportunity that the podiatric residency program provides to both the podiatric and general medical community to become familiar with each other's role in the delivery of health service. Such an environment cultivates conditions which will encourage podiatric medical practice integrated in, rather than isolated from, the main stream of health care.

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EDITORIAL

Professional Isolation

Do facts about what the world is really like destroy our conventional, and occasionally erroneous, beliefs? That is one promise of social science. Ducker, as reported elsewhere in this issue, determined, during the course of her long-term follow-up of California medical students, that those practicing away from the academic medical center do not feel "professionally isolated." This upsets the conventional wisdom; the prevailing myth, of course, is that they do. The dubious origins of this myth are clear enough.

Recent graduates want to avoid "professional isolation" and, therefore, seek practices that assure ready availability of colleagues, medical technology, continuing education, and so forth. Perhaps recent graduates can envision these characteristics of practice only in the urban medical center but not elsewhere. The periphery may appear isolated because most graduates will have seen little of it in their education, and even less during clinical training.

The theme of "professional isolation" appears again and again among the reasons doctors give for the failure of rural regions to attract more of their colleagues. Might the belief about "professional isolation" have other origins quite unrelated to practice experiences? Are these views but part of the universal myth of city versus country, the urbane versus the simple rustic, stimulating company versus solitude, city wealth versus rural poverty—mythical contrasts that are bound to stereotype professional life away from the center as lonely mundane medicine? No matter what their practice, can country physicians really be satisfied? The answers Ducker found were not black or white.

When a sample of California doctors in rural towns and small cities were asked whether they felt "professionally isolated," only a small percentage reported that they often did, while most of them reported they did not. About two-thirds were satisfied with their "hospital admitting privileges," and even more with their office facilities. Their satisfaction with opportunities for continuing education and for professional contacts was somewhat less.

In seeking an explanation for "feeling of professional isolation" among personal, practice, community, and medical and premedical school variables, only one demonstrated an association: Doctors given high ratings by medical school admission interviewers felt more isolated. As the author observes, it is surprising that admission interviews correlate with anything. She speculates that doctors who once shared the academic values of the medical school faculty, thus receiving the approbation of the admissions committee, naturally find rural practice frustrating—certainly a valid question.

Since most doctors do adapt and derive satisfaction from patient care, questions remain. Why do a few fail to adapt? Is it education and training at a medical center or lack of experience with rural practice as a student? If so, is the trend to centralize all residency training in academic centers desirable? If most physicians eventually adapt (most subjects of Ducker's studies are but three years out of school), will some simply require more time than others, or will they remain chronically dissatisfied? If the ideology of medical education and training were more congruent with future practice defined not only as scientific but also as education for the tasks of care outside as well as in the hospital, might more doctors favor practice away from the medical center? Though a trickle of education is moving away from the center's hospitals, it is not an experience required of all students, even less of graduates whose training has been tailored to meet the work pressures of the hospital.

One other rather depressing conclusion must be considered. Admissions committees seem to favor students who are unlikely to look favorably on community practice. This is particularly unfortunate when medical schools are trying to increase their output of primary care physicians to meet the requirements of the 1976 health manpower bill.

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DATAGRAM

Applications Versus Acceptances To 1976–77 First-Year Medical School Class

As part of the preparatory groundwork for a forthcoming national study of the medical school admissions process, data on the number of applications for admission and acceptances to the 1976–77 entering class of U.S. medical schools were obtained from the AAMC Medical Student Information System (Table 1).

A total of 372,282 applications were filed by 42,155 applicants to the 1976–77 entering class, for an average of 8.83 applications per person; however, 7,613 applicants (or 18 percent) filed only one application (Table 2). The next largest group of applicants (3,332) filed five applications each; this is probably related to the fact that the AMCAS fee for each of the first five applications is $5.00, while for the sixth and every subsequent application it is $10.00 each. Persons filing from one to five applications totaled 18,422, or 43.7 percent of all applicants, but they submitted only 46,855, or 12.6 percent of all applications filed.

The 116 medical schools extended 24,804 acceptances to 15,774 individuals for an average of 1.57 acceptances per acceptee. Regardless of the number of applications filed by an applicant, no applicant received more than 13 acceptances. (The two applicants who received 13 acceptances had filed 18 and 27 applications each.) Only 2,662 (the total of the boldface numbers along the diagonal in Table 1) were accepted by all of the schools to which they applied. Furthermore, most (2,551) of these 2,662 acceptees had filed only one application (884 through the Early Decision Plan). Of the 18,422 applicants who filed from one to five applications, 5,115 (or 27.8 percent) were accepted, and these acceptees received a total of 5,724 acceptances (or an average of 1.12).

As more applications per individual were filed, the mean number of acceptances increased up to 2.55 (for those filing 21 applications), but the rate of increase in mean acceptances was almost negligible. This negligible increase reflects the fact that almost 70 percent (69.1 percent) of the acceptees received only a single acceptance and 98.4 percent received 4 or fewer acceptances. The ratio of acceptances to applications decreased steadily from a high of .34 for one application to a low of .02 for 35 or more, but the ratio of acceptees to applicants increased from a low of .25 for applicants filing two applications to a high of .61 for those submitting 28 applications.

It would seem that the tremendous cost of the application process in anxiety, time, effort and money for both the applicants and the medical schools might be reduced if more applicants could target their applications to the five or six schools most likely to accept them rather than using a "buckshot" approach. In terms of Table 1, the aim would be to reduce the number of rows in the table and to increase the boldface numbers along the diagonal, which would mean that applicants are targeting their applications to the schools which will accept them. Perhaps more information and counseling would help applicants to assess realistically the likelihood of their acceptance at different medical schools.

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TABLE 1

NUMBER OF APPLICANTS TO THE 1976–77 ENTERING CLASS OF U.S. MEDICAL SCHOOLS WHO RECEIVED INDICATED NUMBER OF ACCEPTANCES TABULATED BY THE NUMBER OF APPLICATIONS MADE*

No. of Applications Made by Each Applicant	Number of Acceptances Received by Each Applicant*													
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
1	5,062	**2,551**												
2	1,793	496	**91**											
3	1,846	591	111	**18**										
4	1,799	598	111	21	**2**									
5	2,198	879	214	38	3	**0**								
6	1,777	644	208	53	12	5	**0**							
7	1,727	704	254	54	23	5	2	**0**						
8	1,349	528	180	75	35	10	4	1	**0**					
9	1,045	455	176	70	27	9	4	1	1	**0**				
10	1,078	405	168	67	35	15	5	1	0	2	**0**			
11	784	336	123	50	30	14	7	1	2	1	0	**0**		
12	757	311	120	54	22	14	6	2	1	1	0	0	**0**	
13	594	268	116	53	19	17	11	3	1	0	0	0	0	**0**
14	454	233	102	60	20	25	4	3	0	1	0	0	0	0
15	382	223	92	44	28	18	10	3	0	0	0	0	0	0
16	385	165	96	39	26	18	7	5	1	2	0	0	0	0
17	374	139	75	36	15	13	6	2	2	0	2	0	0	0
18	303	146	64	31	22	11	7	8	2	3	1	0	0	0
19	285	129	71	41	18	8	4	4	3	2	0	0	0	0
20	309	144	72	28	18	11	4	5	1	3	1	0	0	0
21	220	93	42	28	10	8	4	5	4	3	0	1	0	0
22	198	85	40	25	4	10	1	8	0	1	1	1	0	0
23	158	77	35	16	7	5	6	8	3	1	0	0	0	0
24	151	80	30	16	11	5	1	5	1	0	1	0	1	0
25	139	69	39	21	13	2	3	1	0	1	0	0	0	0
26	123	66	29	8	6	5	2	1	0	1	1	0	0	0
27	108	54	21	12	8	5	2	1	1	0	0	0	1	0
28	63	54	18	12	7	1	4	1	1	1	0	0	0	0
29	87	44	14	10	5	2	2	3	5	0	0	0	0	0
30	82	48	20	13	9	4	1	0	1	0	0	0	0	0
31	59	24	10	12	6	3	3	0	0	1	0	0	0	0
32	58	28	10	6	4	3	0	0	1	0	0	0	0	0
33	35	24	13	5	2	2	0	1	0	0	0	0	0	0
34	42	23	6	7	4	2	0	1	1	0	0	0	0	0
35 or more	386	162	74	48	36	11	4	1	5	3	0	0	0	0
Total applicants receiving indicated no. of acceptances	26,581	10,898	2,785	1,081	490	266	118	61	35	25	9	1	3	2
Total acceptances	0	10,898	5,570	3,243	1,960	1,330	708	427	280	225	90	11	36	26

* The figures in bold type are the numbers of applicants who received the maximum possible number of acceptances, that is, as many acceptances as they filed applications.

TABLE 2

SUMMARY DATA RELATING THE NUMBER OF APPLICATIONS AND OF ACCEPTANCES OF APPLICANTS TO THE 1976–77 ENTERING CLASS

No. of Applications Made by Each Applicant	Total Applicants Filing Indicated No. of Applications	Total Applications	Total No. of Acceptances	Total No. of Acceptees	Mean No. of Acceptances	Ratio of Acceptances to Applications	Ratio of Acceptees to Applicants
1	7,613	7,613	2,551	2,551	1.00	.34	.34
2	2,380	4,760	678	587	1.16	.14	.25
3	2,566	7,698	867	720	1.20	.11	.28
4	2,531	10,124	891	732	1.22	.09	.29
5	3,332	16,660	1,433	1,134	1.26	.09	.34
6	2,757	16,542	1,382	1,020	1.35	.08	.37
7	2,619	18,333	1,293	892	1.45	.07	.34
8	2,177	17,416	1,303	828	1.57	.07	.38
9	1,787	16,083	1,201	742	1.62	.07	.42
10	1,777	17,770	1,220	699	1.75	.07	.39
11	1,346	14,806	980	562	1.74	.07	.42
12	1,289	15,468	946	532	1.78	.06	.41
13	1,082	14,066	917	488	1.88	.07	.45
14	1,011	14,154	877	457	1.92	.06	.45
15	901	13,515	831	419	1.98	.06	.46
16	745	11,920	771	359	2.15	.06	.48
17	664	11,288	608	290	2.10	.05	.44
18	599	10,782	661	296	2.23	.06	.49
19	575	10,925	650	290	2.24	.06	.50
20	594	11,880	580	285	2.04	.05	.48
21	432	9,072	541	212	2.55	.06	.49
22	381	8,382	380	173	2.20	.05	.45
23	323	7,429	379	165	2.30	.05	.51
24	300	7,200	317	149	2.13	.04	.50
25	291	7,275	321	152	2.11	.04	.52
26	237	6,162	210	114	1.84	.03	.48
27	214	5,778	241	106	2.27	.04	.50
28	162	4,536	207	99	2.09	.05	.61
29	172	4,988	205	85	2.41	.04	.49
30	177	5,310	189	95	1.99	.04	.54
31	116	3,596	126	57	2.21	.04	.49
32	106	3,392	101	48	2.10	.03	.45
33	84	2,772	91	49	1.86	.03	.58
34	85	2,890	92	43	2.14	.03	.51
35 or more	730	31,697	751	344	2.18	.02	.47
Total	42,155	372,282	24,804	15,774	1.82	.07	.37

BOOK REVIEW

Construction and Use of Written Simulations. CHRISTINE H. MCGUIRE, LAWRENCE M. SOLOMON, AND PHILIP G. BASHOOK. New York: The Psychological Corporation, 1976. 307 pp. Paper, $17.95

Construction and Use of Written Simulations describes itself as a " 'how-to-do-it' manual to help potential authors construct sound, challenging, and sophisticated simulations. . . . ", and, indeed, it is; it is lucid, well organized, and laced with examples showing what a written simulation (ws) is like from the points of view of both the user (for example, a simulation called "The Traveler" is provided for readers to work through) and the simulation writer (for example, "The Traveler" is also presented in flowchart form). One way to look at the book, then, is in terms of how well it can be expected to succeed in helping its readers become simulation writers.

In conducting a survey of teaching practices, this reviewer and his colleagues relied heavily on ws's as data collection devices. They used a prepublication version of this book to train both themselves and consultants to write ws's. Moreover, one of the authors, Philip Bashook, helped them through the intricacies so well described. They were fortunate in the latter regard, since it takes more than just reading to learn to write a ws; it takes practice, something the book cannot provide. Further, it is probably necessary to have someone knowledgeable in ws writing to direct one's work.

But experience and supervision are not the only requirements. Certain personality traits seem to be predictive of how well or how easily a person can pick up ws writing. First (and most importantly), it is useful to be (using Robert M. Pirsig's distinction in *Zen and the Art of Motorcycle Maintenance*) more analytic than romantic—not totally analytic but analytic enough to be able to visualize the problem-solving sequence in a ws as a series of sequential steps (usually) related to each other in a branching manner with each subsequent step dependent on one or more of the preceding ones. Further, a ws writer would have to be romantic enough to capture, in prose, the "essence" of the problem situation in a manner which will neither cue nor distract the student from the most acceptable routes through the simulation. It is a challenging and rewarding task.

Second, the ws writer must be able to visualize unacceptable routes which would be attractive to a student with an incomplete or incorrect knowledge of the area covered by the ws. This can be difficult for some persons who have been correctly doing whatever the simulation covers for so long that they cannot conceive of doing it any other way.

Third, it is necessary to visualize the sections in the simulation in a particular relation to one another. Specifically, a student does not "get a section right" before moving on to the next section; movement from one section to the next is not controlled in a yes ("you got it right")—no ("you got it wrong; do not proceed") manner. Rather, movement from section to section is on the basis of current decisions (whether right or wrong) and information (whether complete or incomplete). Apparently, this conceptualization is difficult for some individuals.

Finally, it is necessary to be compulsive in writing a simulation; there are a lot of options and branches to keep track of, and failure to do so results in problems. This, however, is the easiest of the four problems to overcome—working on simulations in pairs with one member of each pair compulsive is good enough.

Thus the book's usefulness in helping people become simulation writers is likely limited by the nature of the people to be helped. But can the book be faulted for not considering the personal characteristics of persons who become good simulation writers? I think not. First, it is not clear that all agree that this list of four is either exhaustive or correct; and, second, the responsibility for developing instructional and/or evaluation tools (including ws's) is usually thrust on people for reasons other than personal predispositions. And under these circumstances, such warnings could do more harm than good. Further, the issue of identifying the characteristics of good ver-

sus bad simulation writers can be attacked empirically, and, until that is done, lists such as the preceding one must be considered speculative.

There is an issue, however, that should be discussed in a book designed to help people become simulation writers which is not considered in *Construction and Use of Written Simulations*: the characteristics of students who take readily to the use of simulations versus the characteristics of those who do not. The authors do point out that there are limitations to the use of simulations, but they do not discuss people who either have initial difficulty "taking" simulations or those who never learn to use the technique. These are important issues.

It does take experience to become acclimated to using ws's. Most importantly, this involves learning how to use the technique to gather information or make decisions and, also of importance, to use the latent image format.

Data on the issue of learning to use a ws are generally hard to come by. The experience of the reviewer and his colleagues (using faculty members as subjects) is that anywhere from 3 percent to 9 percent of persons who attempt a written simulation (whether for the first, second, or third time) will either leave it blank or become muddled in working through it.

Then too, the authors do not write about how a student's performance on a simulation relates to the way he learns or tests using other techniques. This sort of information would be useful both in deciding whether a simulation is the most reasonable choice in a given learning or testing situation and allowing the ws constructor to "partial out" the portion of the results due to the artifact associated with using a written simulation.

If the book is flawed by omissions, it has strength in the unexpected area of considering evaluation techniques generally. Specifically, the authors raise a series of issues about simulations that should be asked of testing techniques generally. These issues include both what constitutes proficiency and how it is best measured; they are seldom raised with the clarity of this book.

Some evaluational problems are not considered, but anyone claiming an evaluator's credentials can pick them out readily. There is no doubt that considering these issues will help one write good simulations.

Does the book succeed in achieving its purpose of helping people become good simulation writers? On balance, this reviewer believes it does. The goal is modest, of course, and reflects what seems to be the authors' view, that is, that while writing "sound, challenging, and sophisticated simulations" can be facilitated by the use of this book, it nevertheless requires experience.

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The need to teach general practice. Irwin WG.
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Academic general practice: is it relevant? [editorial] Reiss BB.
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Pilot evaluation of teaching strategies in ambulatory pediatrics. O'Shea JS, et al. **South Med J** 70(6):657–9, Jun 77
A pediatric residency program revisited. Smith SM, et al.
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'If we want GPs, we'll have to admit them to medical school'. McConnell DG. **Urban Health** 5(5):58, 63–5, 72, Oct 76
[Psychoanalysis and psychiatric training: author's transl.] Held T.
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[Instruction in the specialty course medical-surgical nursing in the São Paulo University School of Nursing] Araujo CP, et al. **Rev Enferm Novos Dimens** 3(3):169–72, May-Jun 77 (Port)
[Teaching of medical-surgical nursing qualifications in the University of São Paulo's School of Nursing. Analysis of the medical-surgical nursing program. Hides elapsed in 1976] Kamiyama Y, et al. **Rev Esc Enferm USP** 11(1):51–69, Apr 77 (Port)
[Principles for organizing the teaching of anesthesiology and resuscitation in a medical institute] Novikova RI, et al. **Anesteziol Reanimatol** 1(2):73–6, Mar-Apr 77 (Rus)
[Current status and prospects of teaching public health economics in medical school] Ermakov VV, et al.
Sov Zdravookhr 1(4):58–62, 1977 (Rus)
[Optimization of the learning process at the Chair of otorhinolaryngology of a medical institute] Kuskov VV, et al. **Vestn Otorinolaringol** (6):58–9, May-Jun 77 (Rus)
[Socialist competition is a powerful factor in education]
Zdravookhr Ross Fed (4):3–7, 1977 (Rus)
[Discussion on post-diploma continuing education in obstetrics and gynecology] Beazley JM.
Jugosl Ginekol Opstet 16(3–4):421–5, 1976 (ser)
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STUDENTS

Education of a psychiatric clerkship by videotape. Meyerson AT, et al. **Am J Psychiatry** 134(8):883–6, Aug 77
The new-doctor interviews [letter] Anderson JP. **Br Med J** 1(6077):1662–3, 25 Jun 77
Time spent driving: considering the medical student to the extent of the driving patient. Cambiaso GW, et al.
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A classification of medical students from medical and nonmedical families. Gough HG, et al. **J Med Educ** 52(7):541–7, Jul 77

Selection of medical specialties: preferences versus choices. Matteson MT, et al. **J Med Educ** 52(7):548–54, Jul 77

TEACHING HOSPITALS

Ready, willing and able—the credo for photo staff success. Biomed Commun 4(5):20–3, Sep 76
Homer G. Phillips historic training hospital for black physicians may pass from the scene. **Urban Health** 5(5):22–4, 26–7, Oct 76
Organization for primary care training in the teaching hospital. Roman SA Jr. **Urban Health** 5(5):50–1, 53, Oct 76
[Reports on medical facilities. 2. Midwives at St. Marianna Medical University Hospital] Yamauchi Y.
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[Historical sketch on medical education at the hospital Salvador] Aviles VM. **Rev Med Chil** 104(12):890–2, Dec 73 (Spa)

TEACHING METHODS AND MATERIALS

Evaluation of a psychiatric clerkship by videotape. Meyerson AT, et al. **Am J Psychiatry** 134(8):883–6, Aug 77
Psychotherapy supervision: the problem of conflicting values. Nadelson C, et al. **Am J Psychother** 31(2):275–83, Apr 77
Role of self-instruction and self-testing in teaching pathology. Curran RC, et al. **Br Med J** 2(6079):107–9, 9 Jul 77
Use of values clarification in clinical psychiatry. Sonnenberg LA, et al. **Compr Psychiatry** 18(4):405–11, Jul-Aug 77
'More light': some recollections and comments on audiovisual education in dermatology. Sulzberger RZ.
Int J Dermatol 16(5):396–408, Jun 77
The practicing family physician as a teacher and learner in a family practice residency. Geyman JP.
J Assoc Hosp Med Educ 30–2, Summer-Fall 76
Teaching in clinical surgery: at the bedside or in the seminar room? Hill GL, et al. **J Med Educ** 52(7):605–7, Jul 77
Pilot evaluation of teaching strategies in ambulatory pediatrics. O'Shea JS, et al. **South Med J** 70(6):657–9, Jun 77
Continuing medical education—pro and con [editorial] Wells BB. **South Med J** 70(6):645–8, Jun 77
[Programmed control of learning during practical classroom sessions and the organization of independent work of students during their extracurricular time] Atanovskii IoL, et al. **Sov Zdravookhr** 1(4):62–4, 1977 (Rus)
[Teaching of problems of work capacity expertise in the medical department]. Golovshchuk IE.
Zdravookhr Ross Fed (5):41–3, 1977 (Rus)

UNDERGRADUATE EDUCATION

Role of self-instruction and self-testing in teaching pathology. Curran RC, et al. **Br Med J** 2(6079):107–9, 9 Jul 77
The evolution and evaluation of a clinical clerkship in family medicine. McWhinney IR, et al. **J Fam Pract** 4(6):1093–9, Jun 77
Developing and implementing a clinical clerkship curriculum. Bird SE, et al. **J Med Educ** 52(7):543–5, Jul 77
The 50 drug program. Chernick WS. **J Med Educ** 52(7):581–4, Jul 77
Pelvic examination [letter] Greenman PE. **J Med Educ** 52(7):619, Jul 77
Teaching in clinical surgery: at the bedside or in the seminar room? Hill GL, et al. **J Med Educ** 52(7):605–7, Jul 77
Development and evaluation of a sex education program for medical students. Lamberti JW, et al. **J Med Educ** 52(7):582–6, Jul 77
Undergraduate medical training for small communities practitioners. Shine RD, et al. **J Med Educ** 51(7):632, Jul 77
The need to teach general practice. Irwin WG.
Med J Aust 1(12):393–5, 19 Mar 77
Academic general practice: is it relevant? [editorial] Reiss BB.
Proc R Soc Med 70(6):377–8, Jun 77
Pilot evaluation of teaching strategies in ambulatory pediatrics. O'Shea JS, et al. **South Med J** 70(6):657–9, Jun 77
Nutrition education in the medical school. Chipman JM.
Urban Health 6(3):31–2, Apr 77
[Refusal of laboratory sessions certificates for non-participation in accompanying lectures] Riegler HJ.
Dtsch Med Wochenschr 102(21):874–5, 20 Jun 77 (Ger)
[Current status and prospects of teaching public health economics in medical school] Ermakov VV, et al.
Sov Zdravookhr 1(4):58–62, 1977 (Rus)
[Optimization of the learning process at the Chair of otorhinolaryngology of a medical institute] Kuskov VV, et al. **Vestn Otorinolaringol** (6):58–9, May-Jun 77 (Rus)

LETTERS TO THE EDITOR

Educational Objectives

We should like to inform your readers of an international collection of educational objectives. As a WHO Collaborating Centre, the British Life Assurance Trust (BLAT) Centre for Health and Medical Education has assembled an international reference collection of objectives by written inquiries for contributions to most medical schools in the world. Teachers and students who consult this collection can select statements that are relevant to their requirements, and the collection can then act as a basis for the formulation of further objectives to meet their own needs. Some of the objectives in the collection have been published by BLAT with the consent of their authors; some are available through commercial publishers; and others, still in a developmental stage, are available in mimeographed form for reference only.

The collection has been divided by the countries of origin, the educational level, the subject matter, and the types of objective. Universities and medical schools from 21 countries have contributed to the collection, and the majority of specified objectives came from the United States, Great Britain, and Canada. It is notable that 104 sets of objectives deal with undergraduate medical education, while only 34 deal with postgraduate education and two sets with continuing education. The collection includes examples of 39 subjects at the undergraduate level, of which the majority is in the areas of physiology in the preclinical area and obstetrics and gynecology and pediatrics in the clinical area. The objectives in the collection were classified as those which were aims, behavioral objectives, objectives including a specification of the level of competence expected from the learner, and curricular objectives, which were those where action verbs were added to detailed lists of syllabi.

The collection is constantly changing as objectives from different centres are revised and updated, and we should be grateful to any medical faculty or medical school which cares to send us its objectives, which would then become part of this international collection.

ELIZABETH WYN PUGH, M.B., *Blat Centre for Health and Medical Education, London, England.*

Clinical Performance

Doctor Hallock and his colleagues in the August issue omit an important fact in comparing a clinical performance of the three- and four-year curricula. The four-year class was the charter class of the University of South Florida. We were experiencing an untried curriculum as it was being developed. In a sense, we were "guinea pigs" for a curriculum which was subsequently streamlined for the following class.

The article implies that the faculty did not know which class we were in. As one librarian wrote me, "??I could tell by your name badges."

GARY PETERSON, M.D., *fellow in child psychiatry, Neuropsychiatric Institute, University of California, Los Angeles.*

Physicians' Spouses

Skipper and Gliebe, in the September issue of the *Journal of Medical Education*, noted the influence that wives have on their doctor husbands' career decisions. With women making up 20 to 25 percent of all medical school acceptees in recent years, it would seem high time for a broadening of research emphasis. May we readers of the *Journal* look forward to a report on physicians' spouses and their influence on medical career decisions?

MERRILL E. SABEY, PH.D., *Department of Psychiatry and the Behavioral Sciences, University of Southern California School of Medicine.*

INDEX TO JOURNAL OF MEDICAL EDUCATION

VOLUME 52 • 1977

Author Index

Abrahamson, S. Changing Curriculum in the Medical School (*Editorial*), 778 (Sept.)

Adler, K. Simulated Patients for Communication Research (*Communications*), 151 (Feb.)

Aloia, J. F., Esswein, A. J., Weissman, M. B. House Staff Performance of the Lumbar Puncture as a Measure of Clinical Skills Teaching (*Communications*), 689 (Aug.)

Andrew, B. J. The Use of Behavioral Checklists To Assess Physical Examination Skills (*Communications*), 589 (July)

Andrus, L. H., O'Hara-Devereaux, M., Burr, B. D., and Mentink, J. L. A New Teacher in Medical Education: The Family Nurse Practitioner, 896 (Nov.)

Anwar, R. A. H., and Wagner, D. K. The Research Component in the Development of Emergency Medicine as a Specialty, 55 (Jan.)

Awais, G. M. Hospital in Saudi Arabia (*Letters to the Editor*), 870 (Oct.)

Baggott, J., Lawrence, D. M., Shaw, F., Galey, M., and Devlin, T. M. Efficiency of Do-It-Yourself Slide-Tape Programs as an Alternative to the Lecture in Medical Biochemistry (*Communications*), 157 (Feb.)

Barbee, R. A., and Dinham, S. M. Student Decision-Making and Performance in a Flexible-Time Curriculum, 882 (Nov.)

Barnett, G. O. *See* Goroll, A. H. et. al., 153 (Feb.)

Barr, D. M. *See* Pittman, J. G., 982 (Dec.)

Barrows, H. S., and Tamblyn, R. M. The Portable Patient Problem Pack: A Problem-Based Learning Unit (*Communications*), 1002 (Dec.)

Beatty, E. *See* Friedman, R. B. et al., 935 (Nov.)

Benedek, E. P., and Bieniek, C. M. Interpersonal Process Recall: An Innovative Technique (*Communications*), 939 (Nov.)

Berner, E. S. *See* Lukas, T. et al., 349 (April)

Bieniek, C. M. *See* Benedek, E. P., 939 (Nov.)

Billings, J. A., and Stoeckle, J. D. Pelvic Examination Instruction and the Doctor-Patient Relationship, 834 (Oct.)

Bird, S. E., and Fosson, A. R. Developing and Implementing a Clinical Clerkship Curriculum (*Communications*), 593 (July)

Birk, S. A. *See* Spellacy, W. N. et al., 901 (Nov.)

Blain, B. B. *See* Reid, J. C., 66 (Jan.)

Blizek, W. L, and Finkler, D. Teaching Human Values in Medicine (*Briefs*), 858 (Oct.)

Boerner, R. J. Family Income of Medical School Applicants and Acceptees and of College Students (*Datagram*), 948 (Nov.)

Bogy, L. T., Douglas, H. L., and Levy, L. A. A Podiatric Medical Residency Program in an Academic Health Science Center (*Communications*), 1005 (Dec.)

Bouchard, R. E., and Tufo, H. M. A Dynamic Primary Care Curriculum Based on the Problem-Oriented System, 508 (June)

Bowen, J. C. *See* Hill, G. L. et al., 595 (July)

Bowie, J. *See* Goroll, A. H. et al., 153 (Feb.)

Boyce, B., and Primov, K. Pao's Selection Method for Quality Papers and the Subsequent Use of Medical Literature (*Communications*), 1001 (Dec.)

Boyer, L., Lee, D., and Kirchner, C. A Student-Run Course in Interprofessional Relations, 183 (March)

Brantz, M. H., and McIlvaine, P. M. The Need for a Health Science Audiovisual Resource List (*Communications*), 937 (Nov.)

Bressler, R. S. A Three Dimensional Model To Demonstrate Head and Tail Formation in Mammalian Embryos (*Communications*), 600 (July)

Breytspraak, L. M., McGee, J., Conger, J. C., Whatley, J. L., and Moore, J. T. Sensitizing Medical Students to Impression Formation Processes in the Patient Interview, 47 (Jan.)

Brinkley, B. R. *See* Levine, H. G. et al., 478 (June)

Brown, D. R. *See* Hess, T. G., 68 (Jan.)

Bruhn, J. G. The Ills of Premedical Advising (*Communications*), 676 (Aug.)

——. **and Hrachovy, R. A.** Black College Students' Attitudes Toward Opportunities in the Health Professions (*Communications*), 847 (Oct.)

Bryan, G. T. *See* Levine, H. G. et al., 478 (June)

Bryant, N. H. Consumer Health Education in a Medical School Curriculum (*Communications*), 587 (July)

Buckley, J. M. *See* Retzer, A. G., 475 (June)

Buhi, W. C. *See* Spellacy, W. N. et al., 901 (Nov.)

Burchard, J. A. *See* Durlak, J. A., 423 (May)

Burke, Y. B. Minority Admissions to Medical Schools: Problems and Opportunities, 731 (Sept.)

Burnside, J. W. *See* Moore, R. A. et al., 323 (April)

Burr, B. D. *See* Andrus, L. H. et al., 896 (Nov.)
Bursztajn, H. The Role of a Training Protocol in Formulating Patient Instructions as to Terminal Care Choices (*Communications*), 347 (April)
Buster, J. *See* Trygstad, C. W., 944 (Nov.)

Camiscioni, J. S. *See* Williams, J. H. et al., 384 (May)
Caplan, R. M. Relating Undergraduate Medical Education to Continuing Medical Education (*Communications*), 674 (Aug.)
Carter, S. A. Evaluation of Undergraduate Medical Curriculum Using Student and Student-Staff Group Discussions (*Communications*), 420 (May)
Cartwright, L. K. Personality Changes in a Sample of Women Physicians, 467 (June)
Casady, R. L., and Hillman, J. R. The Relevancy of Anatomy and Other Basic Sciences to the Practice of Medicine (*Communications*), 210 (March)
Casey, M. J., and Wuerscher, A. Identification of Skills Involved in Effective Interactions Between Physicians and Patients (*Briefs*), 602 (July)
Cassell, E. J., and Skopek, L. Language as a Tool in Medicine: Methodology and Theoretical Framework, 197 (March)
Cassie, J. M., Collins, G. F., and Daggett, C. J. The Use of Videotapes To Improve Clinical Teaching (*Communications*), 353 (April)
Chapel, J. L. *See* Lamberti, J. W., 582 (July)
Char, W. F. *See* Kinzie, J. D. et al., 664 (Aug.)
Checker, A. Continuity Among Department Chairmen in U. S. Medical Schools (*Communications*), 766 (Sept.)
——. **and Dove, D. D.** COTH Survey of House Staff Policy, 1977 (*Datagram*), 863 (Oct.)
Chernick, W. S. The 50-Drug Program (*Communications*), 591 (July)
Chipman, M. *See* Fruen, M. A. et al., 494 (June)
Christensen, J. A. *See* Hallock, J. A. et al., 658 (Aug.)
Christiansen, C. H. *See* Weinberg, A. D. et al., 355 (April)
Clouser, K. D. Medicine, Humanities, and Integrating Perspectives (*Communications*), 930 (Nov.)
Coe, R. M., Pepper, M., and Mattis, M. The 'New' Medical Student: Another View, 89 (Feb.)
Collins, G. F. *See* Cassie, J. M. et al., 353 (April)
Colwill, N. L. *See* Roos, N. P. et al., 345 (April)
Comroe, J. H., Jr. The Evolution of Biomedical Science—Past, Present, Future Perspectives, 3 (Jan.)
Conger, J. C. *See* Breytspraak, L. M. et al., 47 (Jan.)
Cooper, J. A. D. The Association of American Medical Colleges: Looking Ahead from the First Hundred Years, 11 (Jan.)
——. The New Medical College Admission Test (*Editorial*), 77 (Jan.)
Copeland, E. M. *See* Hill, G. L. et al., 595 (July)
Counte, M. A. *See* Hartings, M. F., 824 (Oct.)
Crage, W. D. *See* Pinchoff, D. M. et al., 117 (Feb.)
Cronkhite, L. W., Jr. The Medical and Scientific Community and Big Government, 19 (Jan.)
Cuca, J. M. Applications Versus Acceptances to the 1976–77 First-Year Class of U. S. Medical Schools (*Datagram*), 1010 (Dec.)

Daeschner, C. W., Jr. *See* Levine, H. G. et al., 213 (March)
Daggett, C. J. *See* Cassie, J. M. et al., 353 (April)
Dahl, M. K. *See* Rund, D. A. et al., 520 (June)
Daly, J. J. Venomous Animals and Their Victims: A Program for Sophomore Medical Students, 811 (Oct.)
Davis, D. A. Continuing Education in the Community Hospital: An Interprofessional Approach, 745 (Sept.)
Davis, E. *See* Irby, D. M. et al., 668 (Aug.)
Davis, K. U.S. Health Care: The Road Ahead, 33 (Jan.)
Dean, R. E., and Johnson, T. M. The Surgical Clerkship in the Community Hospital, 59 (Jan.)
DeAtley, C. *See* McCally, M. et al., 776 (Sept.)
De Carvalho, C. A. F., De Souza, R. R., Takiguti, C. K., and König, B., Jr. Comparative Analysis Between Guided Self-Instruction and Conventional Lectures in Neuroanatomy (*Communications*), 212 (March)
DeLuca, V. A., Jr. Continuing Medical Education: Establishing Requirements and Coordinating Teaching Activities (*Communications*), 926 (Nov.)
Denker, M. W. *See* Hallock, J. A. et al., 658 (Aug.)
De Souza, R. R. *See* De Carvalho, C. A. F. et al., 212 (March)
Devlin, T. M. *See* Baggott, J. et al., 157 (Feb.)
De Vries, M. J. *See* Helder, H. et al., 648 (Aug.)
Dinham, S. M. *See* Barbee, R. A., 882 (Nov.)
Donovan, J. C. *See* Geertsma, R. H. et al., 123 (Feb.)
Dorwart, R. A. Student-Sponsored Course Evaluation: A Working Model, 679 (Aug.)
Douglas, H. L. *See* Bogy, L. T. et al., 1005 (Dec.)
Dove, D. D. *See* Checker, A., 863 (Oct.)
Dowaliby, F. J. The Effect of Certain Rater Roles on Confidence in Physician's Assistant Ratings, 914 (Nov.)
Doyle, B. J., and Ware, J. E., Jr. Physician Conduct and Other Factors That Affect Consumer Satisfaction with Medical Care, 793 (Oct.)
Dubé, W. F. Medical Student Enrollment, 1972–73 Through 1976–77 (*Datagram*), 164 (Feb.)
——. COTRANS: An Update, 359 (April)
Ducker, D. G. The Myth of Professional Isolation Among Physicians in Nonurban Areas, 991 (Dec.)
Dudrick, S. J. *See* Hill, G. L. et al., 595 (July)
Duke, J. H., Jr. *See* Hill, G. L. et al., 595 (July)
Dungy, C. I. *See* Hutter, M. J. et al., 328 (April)
——. **and Sander, D. L.** Evaluation of a Child Health Associate Program, 413 (May)
Durlak, J. A., and Burchard, J. A. Preliminary Evaluation of a Hospital-Based Continuing Education Workshop on Death and Dying (*Communications*), 423 (May)

Echt, R., and Sui-Wah, C. A New Problem-Oriented and Student-Centered Curriculum at Michigan State University (*Communications*), 681 (Aug.)
Egan, W. H. Teaching Medical Student Psychiatry Through Contemporary Music (*Communications*), 851 (Oct.)
Eisenberg, J. M. An Educational Program To Modify Laboratory Use by House Staff, 578 (July)
Emery, J. L. R. *See* Levine, H. G. et al., 213 (March)
Entwisle, G., and Hebel, J. R. The Relationship of Reading Skills to Achievement in Medical School (*Communications*), 72 (Jan.)
Erde, E. L. *Moral Problems in Medicine* (*Book Review*), 439 (May)
Erinosho, O. A. Career Goals of Medical Students in Nigeria (*Communications*), 215 (March)
Esswein, A. J. *See* Aloia, J. F. et al., 689 (Aug.)

Favret, A. C. *See* Hutter, M. J. et al., 328 (April)
Feitz, R. H. *See* Lane, M. S., 219 (March)
Feldman, H. A. *See* Korman, L., 308 (April)
Ferrier, B. M., and Hamilton, J. D. A Preparatory Course for Medical Students Who Lack a Conventional Academic Background, 390 (May)
Field, J. *American Medical Education: The Formative Years, 1765–1910* (*Book Review*), 697 (Aug.)
Fine, V. K., and Therrien, M. E. Empathy in the Doctor-Patient Relationship: Skill Training for Medical Students, 752 (Sept.)
Finkler, D. *See* Blizek, W. L., 858 (Oct.)
Finseth, K. A. Office for Women in Medicine: A Model for Social Change (*Communications*), 928 (Nov.)
Folse, R. Bedside Teaching (*Letters to the Editor*), 960 (Nov.)
Forgotson, J. H., and Sweeney, T. J. Use of Videotapes To Teach Child Psychiatry to Medical Students (*Communications*), 351 (April)
Forsyth, B. R. *See* Hilles, W. C. et al., 489 (June)
Fosson, A. R. *See* Bird, S. E., 593 (July)
Frazer, N. B., and Miller, R. H. Training Practical Instructors (Programmed Patients) To Teach Basic Physical Examination (*Communications*), 149 (Feb.)
Friedman, P. *See* Friedman, R. B. et al., 935 (Nov.)
Friedman, R. B., Beatty, E., Korst, D., and Friedman, P. A Diagnostic Aid for Medical Education (*Communications*), 935 (Nov.)
Frierson, H. T., Jr. *See* Stone, R. D. et al., 602 (July)
Fruen, M. A., Chipman, M., and Steiner, J. W. Attrition from General Practice: Career Patterns of Toronto Medical School Graduates, 494 (June)
Fry, R. E. *See* Plovnick, M. S. et al., 516 (June)
Futcher, P. H., Sanderson, E. V., and Tusler, P. A. Evaluation of Clinical Skills for a Specialty Board During Residency Training, 567 (July)

Galey, M. *See* Baggott, J. et al., 157 (Feb.)
Gardner, H. H. *See* Grover, P. L., Jr. et al., (April)
Gardner, M. *See* Gregory, I. et al., 427 (May)
Garg, M. L., Gliebe, W. A., and Kleinberg, W. M. Quality in Medical Practice: A Student Program (*Communications*), 514 (June)
Garrard, J., and Verby, J. E. Comparisons of Medical Student Experiences in Rural and University Settings, 802 (Oct.)
Gaumont, M. *See* Roos, N. P. et al., 345 (April)
Geertsma, R. H., Meyerowitz, S., Salzman, L. F., and Donovan, J. C. An Independent Study Program Within a Medical Curriculum, 123 (Feb.)
——. A Special Tutorial for Minority Medical Students: An Account of a Year's Experience, 396 (May)
Geyman, J. P. The 'One-and-Two' Program: A New Direction in Family Practice Residency Training, (*Communications*), 999 (Dec.)
Ghozeil, S. Multisource Evaluation (*Letters to the Editor*), 230 (March)
Giacalone, J. J., and Hudson, J. I. Primary Care Education Trends in U. S. Medical Schools and Teaching Hospitals, 971 (Dec.)
Gibson, C. D., Jr. Government and Medicine (*Letters to the Editor*), 442 (May)
Givner, N. *See* Klintberg, I. G., 518 (June)
Gjerde, C. L. Integration of Computers into a Course in Biostatics (*Communications*), 687 (Aug.)
Glaser, W. *See* Grover, P. L., Jr. et al., 338 (April)
Glenn, J. K. *See* Pierson, S. et al., 555 (July)
Gliebe, W. A. *See* Garg, M. L. et al., 514 (June)
—— *See* Skipper, J. K., Jr., 764 (Sept.)

Gordon, M. J., Hadac, R. R., and Smith, C. K. Evaluation of Clinical Training in the Community, 888 (Nov.)
Gordon, T. L., and Johnson, D. G. Study of U.S. Medical School Applicants, 1975–76, 707 (Sept.)
——. Applicants for 1976–77 First-Year Medical School Class (*Datagram*), 780 (Sept.)
Goroll, A. H., Barnett, G. O., Bowie, J., and Prather, P. Teaching Differential Diagnosis by Computer: A Pathophysiological Approach (*Communications*), 153 (Feb.)
Gough, H. G., and Hall, W. B. A Comparison of Medical Students from Medical and Nonmedical Families, 541 (July)
Graettinger, J. S. NIRMP (*Letters to the Editor*), 176 (Feb.)
——. Programs and Positions Available to U.S. Medical Students Through NIRMP, 1976, 375 (May)
Grayson, M., Nugent, C., and Oken, S. L. A Systematic and Comprehensive Approach to Teaching and Evaluating Interpersonal Skills, 906 (Nov.)
Green, G. A. Evaluation of Applicants (*Letters to the Editor*), 442 (May)
Green, L. A. *See* London, R. L., 140 (Feb.)
Greene, M. G. *See* Stewart, M. M. et al., 145 (Feb.)
Greenman, P. E. Pelvic Examination (*Letters to the Editor*), 619 (July)
Gregory, I., Smeltzer, D. J., Knopp, W., and Gardner, M. Teaching of Psychiatry by PSP: Impact on NBME Examination Scores (*Communications*), 427 (May)
Grimes, R. M., Lee, J. M., Lefko, L. A., and Hemphill, F. M. A Study of Factors Influencing the Rural Location of Health Professionals (*Communications*), 771 (Sept.)
Grover, P. L., Jr., Meyerowitz, S. M., Gardner, H. H., and Glaser, W. An HMO-Based Primary Care Curriculum for First-Year Medical Students (*Communications*), 338 (April)
Grubbs, J. H. Operational Definitions for Service, Training, Education, and Learning, 190 (March)

Hadac, R. R. *See* Gordon, M. J. et al., 888 (Nov.)
Hain, J. D. *See* Stritter, F. T., 155 (Feb.)
Haley, H. B., Huynh, H., Paiva, R. E., and Juan, I. R. Students' Attitudes Toward Cancer: Changes in Medical School, 500 (June)
Hall, W. B. *See* Gough, H. G., 541 (July)
Hallock, J. A., Christensen, J. A., Denker, M. W., Hochberg, C. J., Trudeau, W. L., and Williams, J. W. A Comparison of the Clinical Performance of Students in Three- and Four-Year Curricula, 658 (Aug.)
Hamburg, D. A. Recent Developments Bearing Upon National Policy in the Health Sciences, 25 (Jan.)
Hamilton, J. D. *See* Ferrier, B. M., 390 (May)
Hansen, C. M. A Program To Introduce Medical Students to the Problem of Child Abuse and Neglect (*Communications*), 522 (June)
Harrell, G. T. Continuing Education (*Editorial*), 434 (May)
——. Family Medicine (*Letters to the Editor*), 620 (July)
Harris, G. I. *See* Potchen, E. J. et al., 602 (July)
Hartings, M. F., and Counte, M. A. An Administrative and Curricular Model for Behavioral Science Teaching, 824 (Oct.)
Harward, D. *See* Stone, R. D. et al., 602 (July)
Hebel, J. R. *See* Entwisle, G., 72 (Jan.)
Heiman, M. F. *Teaching Behavior Modification* (*Book Review*), 783 (Sept.)
Helder, H., Verbrugh, H. S., and De Vries, M. J. Toward an Holistic Education in Pathology and Medicine, 648 (Aug.)
Hemphill, F. M. *See* Grimes, R. M. et al., 771 (Sept.)
Herman, M. W., and Veloski, J. Family Medicine and Primary Care: Trends and Student Characteristics, 99 (Feb.)
Hess, T. G., and Brown, D. R. Actuarial Prediction of Performance in a Six-Year A.B.–M.D. Program (*Communications*), 68 (Jan.)
Hill, G. L., Bowen, J. C., Copeland, E. M., MacFadyen, B. V., Jr., Duke, J. H., Jr., and Dudrick, S. J. Teaching in Clinical Surgery: At the Bedside or in the Seminar Room? (*Communications*), 595 (July)
Hill, R. F. *See* Skoner, M. M., 355 (April)
Hilles, W. C., Forsyth, B. R., and Porten, H. J. The Questionnaire as a Data-Gathering Device: Medical School Response Patterns, 489 (June)
Hillman, J. R. *See* Casady, R. L., 210 (March)
Hochberg, C. J. *See* Hallock, J. A. et al., 658 (Aug.)
Hodge, R. H., Jr., and Reid, R. A. A Method for Assuring Continuity of Care in Residency Training Experience, 739 (Sept.)
Hofmeister, R. W. *See* Pierson, S. et al., 555 (July)
Holman, H. R. *See* Rund, D. A. et al., 520 (June)
Holyoke, E. A. *See* Prentice, E. D. et al., 758 (Sept.)
Hood, A. B. *See* Staley, K. H., 849 (Oct.)
Hrachovy, R. A. *See* Bruhn, J. G., 847 (Oct.)
Hudson, J. I. *Primary Care in a Specialized World* (*Book Review*), 611 (July)
——. *See* Giacalone, J. J., 971 (Dec.)
Hutter, M. J., Dungy, C. I., Zakus, G. E., Moore, V. J., Ott, J. E., and Favret, A. C. Interviewing Skills: A Comprehensive Approach

to Teaching and Evaluation, 328 (April)
Huynh, H. *See* Haley, H. B. et al., 500 (June)

Ingall, J. R. F. *See* Pinchoff, D. M. et al., 117 (Feb.)
——. NHI Semantics (*Letters to the Editor*), 372 (April)
Ingersoll, R. W. The Evaluation of Administrative Performance (*Editorial*), 526 (June)
Irby, D. M., Shannon, N. F., Scher, M., Peckham, P., Ko, G., and Davis, E. The Use of Student Ratings in Multiinstructor Courses, 668 (Aug.)
Isaacs, J. C., and Thomas, J. Income Analysis of University-Owned Teaching Hospitals (*Datagram*), 528 (June)

Jacoby, K. *See* Rund, D. A. et al., 520 (June)
Jensen, R. H. *See* Prentice, E. D. et al., 758 (Sept.)
Johnson, D. G. *See* Gordon, T. L., 707 (Sept.)
Johnson, T. M. *See* Dean, R. E., 59 (Jan.)
Juan, I. R. *See* Haley, H. B. et al., 500 (June)

Kalivas, J. Financing Medical Education (*Letters to the Editor*), 705 (Aug.)
Kammerer, W. S. *See* Moore, R. A. et al., 323 (April)
Kanakis, C. *See* Lukas, T. et al., 349 (April)
Kappelman, M. M. *See* Mason, J. L., 341 (April)
Katz, D. L., and Kubiak, R. J. The Use of a Flexible Teaching Head for Video Laparoscopy (*Briefs*), 859 (Oct.)
Kegel-Flom, P. Predictors of Rural Practice Location, 204 (March)
Keller, A. H., Jr. Ethics/Human Values Education in the Family Practice Residency, 107 (Feb.)
Keller, K. *See* Podell, R. N., 160 (Feb.)
Kennedy, D. A. *See* McGlynn, T. J., Jr. et al., 840 (Oct.)
Kepler, M. O. A Study of Some Short-Term Effects Related to a Course in Human Values (*Briefs*), 160 (Feb.)
Kinzie, J. D., Char, W. F., Markoff, R. A., and McDermott, J. F., Jr. Objectives of Psychiatric Education in a Primary Care Curriculum, 664 (Aug.)
Kirchner, C. *See* Boyer, L. et al., 183 (March)
Kleinberg, W. M. *See* Garg, M. L. et al., 514 (June)
Klintberg, I. G., and Givner, N. The Comparability of Clerkship Experiences in a Variety of Locations (*Communications*), 518 (June)
Knopp, W. *See* Gregory, I. et al., 427 (May)
Ko, G. *See* Irby, D. M. et al., 668 (Aug.)
Koch-Weser, D. *Health Care: An International Study* (*Book Review*), 362 (April)
König, B., Jr. *See* De Carvalho, C. A. F. et al., 212 (March)
Korman, L., and Feldman, H. A. A Study of the Recruitment of Physicians into Three Northern New York Counties, 308 (April)
Korst, D. R. The Independent Study Program at the University of Wisconsin Medical School, 404 (May)
——. *See* Friedman, R. B. et al., 935 (Nov.)
Krupp, P. *See* McKegney, F. P., 425 (May)
Kubiak, R. J. *See* Katz, D. L., 859 (Oct.)

Lake, K. *See* Roeske, N. A., 459 (June)
Lake, P. A. Interspecialty Communication (*Briefs*), 354 (April)
Lamberti, J. W., and Chapel, J. L. Development and Evaluation of a Sex Education Program for Medical Students, 582 (July)
Lane, M. S., and Feitz, R. H. MCAT Performance by Selected Characteristics of Medical School Aspirants (*Datagram*), 219 (March)
Lange, P. *See* Stewart, M. M. et al., 145 (Feb.)
Lantz, K. H. *See* Reid, R. A., 301 (April)
Laskoski, L. Salaries of Strict Full-Time Faculty in U.S. Medical Schools (*Datagram*), 436 (May)
Lawrence, D. M. *See* Baggott, J. et al., 157 (Feb.)
Lee, A. A Simple Method for Encouraging Active Participation in Small-Group Discussion Sessions (*Communications*), 432 (May)
Lee, A. C. *See* Ramsay, D. L. et al., 598 (July)
Lee, D. *See* Boyer, L. et al., 183 (March)
Lee, J. M. *See* Grimes, R. M. et al., 771 (Sept.)
Lefko, L. A. *See* Grimes, R. M. et al., 771 (Sept.)
Levine, H. G., Daeschner, C. W., Jr., and Emery, J. L. R. Evaluation of a Modularized System of Instruction in Pediatrics (*Communications*), 213 (March)
—— **Brinkley, B. R., and Bryan, G. T.** Internal Review as a Means of Maintaining Quality Education in a Medical School, 478 (June)
Levy, L. A. *See* Bogy, L. T. et al., 1005 (Dec.)
Lewy, R. M. The Emergence of the Family Practitioner: An Historical Analysis of a New Specialty, 873 (Nov.)
Liebman, A. Evaluating Medical Students (*Letters to the Editor*), 540 (June)
Lloyd, J. A., and Steinberger, E. Training in Reproductive Biology and Human Sexuality in American Medical Schools (*Communications*), 74 (Jan.)
London, R. L., and Green, L. A. Do Family Medicine Residents and Their Teachers Have Common Goals? (*Communications*), 140 (Feb.)
Lukas, T., Berner, E. S., and Kanakis, C. Diagnosis by Smell? (*Communications*), 349 (April)

MacFadyen, B. V., Jr. *See* Hill, G. L. et al., 595 (July)

Malish, D. House Staff Unionization (*Letters to the Editor*), 870 (Oct.)
Marienfield, R. D. Comparison of Initial House Staff Goals with Eventual Career Plans in Internal Medicine (*Communications*), 853 (Oct.)
Markoff, R. A. *See* Kinzie, J. D. et al., 664 (Aug.)
Mason, J. L., and Kappelman, M. M. A Survey of Medical School Continuing Education Programs (*Communications*), 341 (April)
Matteson, M. T., and Smith, S. V. Selection of Medical Specialties: Preferences Versus Choices, 548 (July)
Mattis, M. *See* Coe, R. M. et al., 89 (Feb.)
May, J. R., and Miller, P. R. Note-Taking and Information Recall: An Empirical Study (*Communications*), 524 (June)
McCally, M., Sorem, K., and Silverman, M. Interprofessional Education of the New Health Practitioner, 177 (March)
——. **DeAtley, C., and Piemme, T. E.** Teaching Emergency Care to First-Year Medical Students (*Communications*), 776 (Sept.)
McDermott, J. F., Jr. *See* Kinzie, J. D. et al., 664 (Aug.)
McGee, J. *See* Breytspraak, L. M. et al., 47 (Jan.)
McGinnis, J. M. Whither International Health? (*Editorial*), 161 (Feb.)
——. Improving Access to Health Care: Incentives, Regulations, or Substitutions? (*Editorial*), 691 (Aug.)
McGlynn, T. J. *See* Moore, R. A. et al., 323 (April)
——. **Sayre, A., and Kennedy, D. A.** A Sophomore Physical Diagnosis Course in an Outpatient Setting, 840 (Oct.)
McGrath, E., and Zimet, C. N. Female and Male Medical Students: Differences in Specialty Choice Selection and Personality, 293 (April)
McGuire, F. L. Fifteen Years of Predicting Medical Student Performance (*Communications*), 416 (May)
McIlvaine, P. M. *See* Brantz, M. H., 937 (Nov.)
McKegney, F. P., and Krupp, P. A Useful Coordination Between Gross Anatomy and Human Behavior Courses (*Communications*), 425 (May)
McNamara, D. G. *See* Weinberg, A. D. et al., 355 (April)
Meiklejohn, G. *See* Spellman, M. W., 623 (Aug.)
Meleca, C. B. *See* Williams, J. H. et al., 384 (May)
Mentink, J. L. *See* Andrus, L. H. et al., 896 (Nov.)
Merenstein, G. B. *See* Squire, E. N., Jr., 859 (Oct.)
Metcalf, W. K. *See* Prentice, E. D. et al., 758 (Sept.)
Meyerowitz, S. M. *See* Geertsma, R. H. et al., 123 (Feb.)
——. *See* Grover, P. L., Jr. et al., 338 (April)
Middents, G. J. A Pilot Project for Assessing Nonacademic Characteristics of Premedical Students (*Communications*), 343 (April)
Miller, G. E. *Individualizing the Study of Medicine: The Ohio State University College of Medicine Independent Study Program (Book Review)*, 167 (Feb.)
Miller, P. R. *See* May, J. R., 524 (June)
Miller, R. H. *See* Frazer, N. B., 149 (Feb.)
Moehring, M. *See* Norman, M. et al., 147 (Feb.)
Moore, J. T. *See* Breytspraak, L. M. et al., 47 (Jan.)
Moore, R. A., Kammerer, W. S., McGlynn, T. J., Trautlein, J. J., and Burnside, J. W. Consultations in Internal Medicine: A Training Program Resource, 323 (April)
Moore, V. J. *See* Hutter, M. J. et al., 328 (April)
Muckel, T. J. Future of Pathology (*Letters to the Editor*), 958 (Nov.)

Nadel, E. M. Financing Medical Education (*Letters to the Editor*), 371 (April)
Nadelson, C. C., Notman, M. T. and Poussaint, A. F. Early Clinical Experience in Behavioral Science Teaching (*Communications*), 683 (Aug.)
Nader, P. R. *See* Parcel, G. S. et al., 429 (May)
Naftulin, D. H. Simulated Patients (*Letters to the Editor*), 705 (Aug.)
Navin, T. R., and Nichols, A. W. Evaluation of the Arizona Medical Student Exchange Program, 817 (Oct.)
Neufeld, V. R. Physician Migration (*Letters to the Editor*), 230 (March)
Nichols, A. W. *See* Navin, T. R., 817 (Oct.)
Norman, M., Silverman, W., and Moehring, M. A Cooperative College-Hospital Format for the Premedical Student (*Communications*), 147 (Feb.)
Notman, M. T. *See* Nadelson, C. C. et al., 683 (Aug.)
Nugent, C. *See* Grayson, M. et al., 906 (Nov.)

O'Connor, R. J. Individualizing Instruction Via Random-Access Videocasettes (*Briefs*), 859 (Oct.)
O'Hara-Devereaux, M. *See* Andrus, L. H. et al., 896 (Nov.)
Oken, S. L. *See* Grayson, M. et al., 906 (Nov.)
O'Leary, D. S. *See* Schroeder, S. A., 418 (May)
Otis, G. D. Faculty Role Expectation: Perception Discrepancies and Departmental Affiliation, 39 (Jan.)
Ott, J. E. *See* Hutter, M. J. et al., 328 (April)

Paiva, R. E. *See* Haley, H. B. et al., 500 (June)
Parcel, G. S., Nader, P. R., and Tiernan, K. Evaluation of an Outreach Activity of Pediatric Clerkship Training (*Communications*), 429 (May)
Peay, M. Y. The Use of Clinical Observations in the Teaching of Behavioral Science (*Communications*), 685 (Aug.)
Peckham, P. *See* Irby, D. M. et al., 668 (Aug.)
Pengov, R. E. *See* Williams, J. H. et al., 384 (May)
Pepper, M. *See* Coe, R. M. et al., 89 (Feb.)
Perry, H. B., III. An Analysis of the Professional Performance of Physician's Assistants, 639 (Aug.)
Peterson, G. Clinical Performance (*Letters to the Editor*), 1020 (Dec.)
Peterson, O. L., and Stoeckle, J. D. Professional Isolation (*Editorial*), 1008 (Dec.)
Piemme, T. E. *See* McCally, M. et al., 776 (Sept.)
Pierson, S., Glenn, J. K., and Hofmeister, R. W. Some Considerations in the Design of Family Practice Residency Experiences, 555 (July)
Pinchoff, D. M., Ingall, J. R. F., and Crage, W. D. Observations on a Rural Health Manpower Project, 117 (Feb.)
Pittman, J. G., and Barr, D. M. Undergraduate Education in Primary Care: The Rockford Experience, 982 (Dec.)
Plovnick, M. S., Fry, R. E., and Rubin, I. M. A Management Development Course for Physicians (*Communications*), 516 (June)
Podell, R. N., and Keller, K. Teaching Ambulatory Care to Primary Physicians (*Briefs*), 160 (Feb.)
Pointer, D. D. *Labor Relations in the Health Professions: The Basis of Power, the Means of Change (Book Review)*, 222 (March)
Polk, H. C., Jr. Can AHES Really Influence the Distribution of Physicians? 633 (Aug.)
Porten, H. J. *See* Hilles, W. C. et al., 489 (June)
Potchen, E. J., Harris, G. I., Schonbein, W. R., Santora, P. B., and Sontag, B. H. Physicians and Their Careers as Products of Medical Education (*Briefs*), 602 (July)
Poussaint, A. F. *See* Nadelson, C. C. et al., 683 (Aug.)
Prather, P. *See* Goroll, A. H. et al., 153 (Feb.)
Prentice, E. D., Metcalf, W. K., Quinn, T. H., Sharp, J. G., Jensen, R. H., and Holyoke, E. A. Stereoscopic Anatomy: Evaluation of a New Teaching System in Human Gross Anatomy, 758 (Sept.)
Primov, K. *See* Boyce, B., 1001 (Dec.)
Pugh, E. W. Educational Objectives (*Letters to the Editor*), 1020 (Dec.)

Quinn, T. H. *See* Prentice, E. D. et al., 758 (Sept.)

Ramsay, D. L., Lee, A. C., and Solomon, L. M. Attitudes Toward Patient Management Problems as a Self-Assessment Technique in Dermatology (*Communications*), 598 (July)
Rauch, J. S. *See* Schwartz, M. W., 857 (Oct.)
Raw, I. The Integration of Nutrition Education in the Basic Biomedical Sciences, 654 (Aug.)
Redfield, D. L. *See* Stillman, P. L. et al., 942 (Nov.)
Reid, J. C., and Blain, B. B. Identifying Students Who Will Be in Academic Difficulty in Medical School (*Communications*), 66 (Jan.)
Reid, R. A., and Lantz, K. H. Physician Profiles in Training the Graduate Internist, 301 (April)
——. *See* Hodge, R. H., Jr., 739 (Sept.)
Rezler, A. G., and Buckley, J. M. A Comparison of Personality Types Among Female Student Health Professionals, 475 (June)
Richstone, N. *See* Stewart, M. M. et al., 145 (Feb.)
Roeske, N. A., and Lake, K. Role Models for Women Medical Students, 459 (June)
Roos, N. P., Gaumont, M., and Colwill, N. L. Female and Physician: A Sex Role Incongruity (*Communications*), 345 (April)
Rosen, H. M., and Rudich, A. A. Physician Participation in Health Administrator Education, 562 (July)
Rubin, I. M. *See* Plovnick, M. S. et al., 516 (June)
Rudich, A. A. *See* Rosen, H. M., 562 (July)
Rund, D. A., Jacoby, K., Dahl, M. K., and Holman, H. R. Clinical Learning Without Prerequisites: Students as Clinical Teachers (*Communications*), 520 (June)
Ruppert, E. S., Trzebiatowski, G. L., and Sachs, L. A. An Independent Study Program in the Clinical Clerkship Years (*Communications*), 855 (Oct.)

Sabers, D. L. *See* Stillman, P. L. et al., 942 (Nov.)
Sachs, L. A. *See* Williams, J. H. et al., 384 (May)
——. *See* Ruppert, E. S. et al., 855 (Oct.)
——. Using Ratings of Primary Care Tasks as a Guide to Making Curricular Decisions (*Communications*), 932 (Nov.)
Sadler, G. R. *See* Warburton, S. W., 768 (Sept.)
Salzman, L. F. *See* Geertsma, R. H. et al., 123 (Feb.)
Sander, D. L. *See* Dungy, C. I., 413 (May)
Sanderson, E. V. *See* Futcher, P. H. et al., 567 (July)
Santora, P. B. *See* Potchen, E. J. et al., 602 (July)
Sarty, M. E. Physicians' Spouses (*Letters to the Editor*), 1020 (Dec.)
Savoy, R. W. State Roles in Financing Medical Education (*Datagram*), 607 (July)
——. State Government Payments to Out-of-State Medical Schools for Enrolling Their Residents (*Datagram*), 694 (Aug.)

Sayre, A. *See* McGlynn, T. J., Jr. et al., 840 (Oct.)
Scher, M. *See* Irby, D. M. et al., 668 (Aug.)
Schneidman, B. S. An Approach to Obtaining Patients To Participate in Pelvic Examination Instruction (*Communications*), 70 (Jan.)
Schonbein, W. R. *See* Potchen, E. J. et al., 602 (July)
Schor, E. L. Nonphysician Educators (*Letters to the Editor*), 373 (April)
Schroeder, S. A., and O'Leary, D. S. Differences in Laboratory Use and Length of Stay Between University and Community Hospitals (*Communications*), 418 (May)
Schuller, A. B., and Stotz, R. The Medical Record Review and Resident Education, 133 (Feb.)
Schwartz, M. W., and Rauch, J. S. A Structured Curriculum for an Undergraduate Elective Clerkship in Pediatric Nephrology (*Communications*), 857 (Oct.)
Sedlacek, W. E. Institutional Characteristics Associated with Increases in Medical School Class Size (*Communications*), 138 (Feb.)
Shannon, N. F. *See* Irby, D. M. et al., 668 (Aug.)
Sharp, J. G. *See* Prentice, E. D. et al., 758 (Sept.)
Shaw, F. *See* Baggott, J. et al., 157 (Feb.)
Silver, G. A. *Medical Education and the State: The Changing Pattern in Ten Countries (Book Review)*, 532 (June)
Silverman, M. *See* McCally, M. et al., 177 (March)
Silverman, W. *See* Norman, M. et al., 147 (Feb.)
Simons, R. C. *See* Stachnik, T. J., 920 (Nov.)
Skinner, J. F. Premedical Advising: Williams (*Letters to the Editor*), 957 (Nov.)
Skipper, J. K., Jr., and Gliebe, W. A. Forgotten Persons: Physicians' Wives and Their Influence on Medical Career Decisions (*Communications*), 764 (Sept.)
Skoner, M. M., and Hill, R. F. Differences Between Nurse Practitioners and Physician's Assistants (*Briefs*), 355 (April)
Skopek, L. *See* Cassell, E. J., 197 (March)
Slotnick, H. B. *Construction and Use of Written Simulations (Book Review)*, 1013 (Dec.)
Smeltzer, D. J. *See* Gregory, I. et al., 427 (May)
Smilkstein, G. A Model for Teaching Comprehensive Health Care (*Communications*), 773 (Sept.)
Smith, C. K. *See* Gordon, M. J. et al., 888 (Nov.)
Smith, H. *See* Stimmel, B., 484 (June)
Smith, S. V. *See* Matteson, M. T., 548 (July)
Solomon, L. M. *See* Ramsay, D. L. et al., 598 (July)
Sontag, B. H. *See* Potchen, E. J. et al., 602 (July)
Sorem, K. *See* McCally, M. et al., 177 (March)
Spellacy, W. N., Birk, S. A., and Buhi, W. C. A National Survey of Medical School Obstetrics and Gynecology Departments, 1965 to 1975, 901 (Nov.)
Spellman, M. W., and Meiklejohn, G. Faculty Tenure in American Medical Schools, 623 (Aug.)
Sprague, C. C. *Progress and Problems in Medical and Dental Education: Federal Support Versus Federal Control (Book Review)*, 82 (Jan.)
Squire, E. N., Jr., Merenstein, G. B. Service Versus Education in Neonatal Intensive Care (*Briefs*), 859 (Oct.)
Stachnik, T. J., and Simons, R. C. A Comparison of D.O. and M.D. Student Performance, 920 (Nov.)
Staley, K. H., and Hood, A. B. A Longitudinal Study of Female Premedical Attrition (*Communication*), 849 (Oct.)
Stebbins, J. R. Premedical Advising: Toledo (*Letters to the Editor*), 958 (Nov.)
Steinberger, E. *See* Lloyd, J. A., 74 (Jan.)
Steiner, J. W. *See* Fruen, M. A. et al., 494 (June)
Stewart, D. *See* Stillman, P. L. et al., 942 (Nov.)
Stewart, M. M., Richstone, N., Greene, M. G., and Lange, P. Community Medicine Clerkships in an Applied Research Setting (*Communications*), 145 (Feb.)
Stillman, P. L., Sabers, D. L., Redfield, D. L., and Stewart, D. Testing Physical Diagnosis Skills with Videotape (*Communications*), 942 (Nov.)
Stimmel, B., and Smith, H. 'Fifth Pathway' in New York State Medical Schools, 484 (June)
Stoeckle, J. D. *See* Billings, J. A., 834 (Oct.)
——. *See* Peterson, O. L., 1008 (Dec.)
Stone, R. D., Frierson, H. T., Jr., and Harward, D. Undergraduate Medical Training for Small Community Practitioners (*Briefs*), 602 (July)
Stotz, R. *See* Schuller, A. B., 133 (Feb.)
Stritter, F. T., and Hain, J. D. A Workshop in Clinical Teaching (*Communications*), 155 (Feb.)
Sui-Wah, C. *See* Echt, R., 681 (Aug.)
Suter, E. *Recent Trends in Medical Education (Book Review)*, 950 (Nov.)
Sweeney, T. J. *See* Forgotson, J. H., 351 (April)

Takiguti, C. K. *See* De Carvalho, C. A. F. et al., 212 (March)
Tamblyn, R. M. *See* Barrows, H. S., 1002 (Dec.)
Ten Bensel, R. *See* Venters, M., 334 (April)
Therrien, M. E. *See* Fine, V. K., 752 (Sept.)
Thomas, J. *See* Isaacs, J. C., 528 (June)
Thompson, W. G. University of Ottawa Modified Systems Program, 316 (April)
Tiernan, K. *See* Parcel, G. S. et al., 429 (May)
Trautlein, J. J. *See* Moore, R. A. et al., 323 (April)
Trudeau, W. L. *See* Hallock, J. A. et al., 658 (Aug.)
Trygstad, C. W., and Buster, J. Experiences with a Combined Perinatal Clerkship for Third-Year Medical Students (*Communications*), 944 (Nov.)
Trzebiatowski, G. L. *See* Ruppert, E. S. et al., 855 (Oct.)
Tufo, H. M. *See* Bouchard, R. E., 508 (June)
Tusler, P. A. *See* Futcher, P. H. et al., 567 (July)

Tworek, R. K. Interinstitutional Cooperation: A Working Model for Preparing New Health Care Practitioners (*Communications*), 143 (Feb.)

Veloski, J. *See* Herman, M. W., 99 (Feb.)
Venters, M., and Ten Bensel, R. Interdisciplinary Education in Child Abuse and Neglect, 334 (April)
Verbrugh, H. S. *See* Helder, H. et al., 648 (Aug.)
Verby, J. E. *See* Garrard, J., 802 (Oct.)

Wagner, D. K. *See* Anwar, R. A. H., 55 (Jan.)
Waldman, B. Economic and Racial Disadvantage as Reflected in Traditional Medical School Selection Factors, 961 (Dec.)
Warburton, S. W., and Sadler, G. R. House Call Training in the Family Practice Curriculum (*Communications*), 768 (Sept.)
Ware, J. E., Jr. *See* Doyle, B. J., 793 (Oct.)
Weinberg, A. D., Christiansen, C. H., and McNamara, D. G. A Countywide Program To Increase Awareness of Neonatal Tachypnea (*Briefs*), 355 (April)
Weissman, M. B. *See* Aloia, J. F. et al., 689 (Aug.)
Whatley, J. L. *See* Breytspraak, L. M. et al., 47 (Jan.)
Williams, J. H., Pengov, R. E., Sachs, L., Meleca, C. B., and Camiscioni, J. S. A Computer-Assisted Admissions Process, 384 (May)
Williams, J. W. *See* Hallock, J. A. et al., 658 (Aug.)
Wuerscher, A. *See* Casey, M. J., 602 (July)

Yancik, R. Time of Decision To Study Medicine: Its Relation to Specialty Choice (*Datagram*), 78 (Jan.)

Zakus, G. E. *See* Hutter, M. J. et al., 328 (April)
Zimet, C. N. *See* McGrath, E., 293 (April)

Subject Index

Academic Medical Centers:
Expanded commitment to education and training, Cooper, 13 (Jan.)
Involvement in primary care education, Giacalone and Hudson, 971 (Dec.)
Responsibility for new health practitioner, McCally et al., 177 (March)

Admissions:
Applicants for: 1975–76 first-year class, annual study, Gordon and Johnson, 707 (Sept.); 1976–77 first-year class (*Datagram*), Gordon, 780 (Sept.); Family income of applicants (*Datagram*), Boerner, 948 (Nov.); Evaluation by peers (*Letters to the Editor*), Green, 442 (May)
Computer-assisted admissions process, Williams et al., 384 (May)
"Fifth Pathway" program in New York state medical schools, Stimmel and Smith, 484 (June)
Interviews—and physicians' later attitudes toward nonurban practice, Ducker, 991 (Dec.)
Of minority students: Economic and racial disadvantage as reflected in traditional selection factors, Waldman, 961 (Dec.); Problems and opportunities, Burke, 731 (Sept.)
Selection process: Prediction of grade-getting ability (*Communications*), McGuire, 416 (May)

Allied Health Professionals:
Child health associate: Program review, Dungy and Sander, 413 (May); Training in interviewing skills, Hutter et al., 328 (April)
Family nurse practitioner: New teacher in medical education, Andrus et al., 896 (Nov.)
Instruction of, in medical school classrooms, McCalley et al., 177 (March)
Interdisciplinary training: Course in child abuse, Venters and ten Bensel, 334 (April); In a rural area, Pinchoff et al., 117 (Feb.)
Nurse practitioner: Comparison with physician's assistant (*Briefs*), Skoner and Hill, 355 (April); As clinical instructor (*Letters to the Editor*), Schor, 373 (April)
Physician's assistant: Assessment of job performance, Perry, 639 (Aug.); Physical examination skills (*Communications*), Andrew, 589 (July); Training, in cooperative program (*Communications*), Tworek, 143 (Feb.)

Association of American Medical Colleges:
Annual Meeting addresses (1976): 3, 11, 19, 25, 33 (Jan.)
Annual Meeting program (1976): 235 (March)
Annual Report (1976): 247 (March)
Assembly Minutes (1976): 449 (May)

Basic Sciences:
Anatomy, relevance of, to the practice of medicine, Casady and Hillman, 210 (March)
Biochemistry: Use of do-it-yourself slide-tape programs (*Communications*), Baggott et al., 157 (Feb.)
Human gross anatomy: A stereoscopic, slide-based auto-instructional program, Prentice et al., 758 (Sept.)
Independent study program for students in, Korst, 404 (May)
Integration of nutrition education in chemistry-biochemistry sequence of six-year B.S.-M.D. program, Raw, 654 (July)
Review of curriculum in, Levine et al., 481 (June)
Special tutorial in, for minority students, Geertsma, 396 (May)

Behavioral Sciences:
Curriculum in, for first- and second-year medical students, Hartings and Counte, 824 (Oct.)
Ethics/human values as part of behavioral sciences curriculum, Keller, 107 (Feb.)
Instruction in (*Communications*), Nadelson et al., 683 (Aug.)
Use of clinical observations in teaching (*Communications*), Peay, 685 (Aug.)

Bibliography:
Medical education, 84 (Jan.), 169 (Feb.), 224 (March), 364 (April), 444 (May), 535 (June), 613 (July), 699 (Aug.), 785 (Sept.), 865 (Oct.), 952 (Nov.), 1015 (Dec.)

Book Reviews:
Progress and Problems in Medical and Dental Education: Federal Support Versus Federal Control, 82 (Jan.)
Individualizing the Study of Medicine: The Ohio

State University College of Medicine Independent Study Program, 167 (Feb.)
Labor Relations in the Health Professions: The Basis of Power, the Means of Change, 222 (March)
Health Care: An International Study, 362 (April)
Moral Problems in Medicine, 439 (May)
Medical Education and the State: The Changing Pattern in Ten Countries, 532 (June)
Primary Care in a Specialized World, 611 (July)
American Medical Education: The Formative Years, 1765–1910, 697 (Aug.)
Teaching Behavior Modification, 783 (Sept.)
Recent Trends in Medical Education, 950 (Nov.)
Construction and Use of Written Simulations, 1013 (Dec.)

Clinical Sciences:
Child psychiatry: Use of videotapes in teaching (*Communications*), Forgotson and Sweeney, 351 (April)
Internal medicine, consultation service in, Moore et al., 323 (April)
Obstetrics/gynecology: Changes in teaching resources, 1965–75, Spellacy et al., 901 (Nov.); Perinatal clerkships (*Communications*), Trygstad and Buster, 944 (Nov.)
Pathology, holistic approach to education in, Helder et al., 648 (Aug.)
Pediatrics: Modularized system of instruction (*Communications*), Levine et al., 213 (March); Outreach clerkship training (*Communications*), Parcel et al., 429 (May)
Pediatric nephrology, undergraduate medical education in (*Communications*), Schwartz and Rauch, 857 (Oct.)
Psychiatry: Medical students and osteopathic students in a first course, Stachnik and Simons, 920 (Nov.); Curriculum development for primary care students, Kinzie et al., 664 (Aug.), Independent study program (*Communications*), Ruppert et al., 855 (Oct.); Personalized Study Program (*Communications*), Gregory et al., 427 (May); Use of contemporary songs in teaching (*Communications*), Egan, 851 (Oct.)
Surgery: Bedside versus seminar room instruction (*Communications*), Hill et al., 595 (July)

Computers: *See Also* Educational Technology
Admissions process, with the aid of, William, et al., 384 (May)
Instruction in differential diagnosis, with the aid of, (*Communications*), Gorell et al., 153 (Feb.)
Instruction in biostatistics with the aid of (*Communications*), Gleede, 687 (Aug.)

Continuing Medical Education:
Community hospital as site of, Davis, 745 (Sept.)
Coordination of efforts in (*Communications*), DeLuca, 926 (Nov.)
Development of positive attitudes toward (*Communications*), Caplan, 674 (Aug.)
Family practice refresher course, Andrus et al., 898 (Nov.)
Impact of, on quality of care (*Briefs*), Weinberg et al., 355 (April)
Interprofessional planning for, Davis, 745 (Sept.)
Lifelong learning in medicine (*Editorial*), Harrell, 434 (May)
Nonurban practice: The myth of professional isolation, Ducker, 991 (Dec.)
Programs in continuing medical education (*Communications*), Mason and Kappelman, 341 (April)
Use of problem-solving simulations in (*Communications*), Ramsay et al., 598 (July)

Curriculum:
Ambulatory primary care, design of curriculum in, Bouchard and Tufo, 508 (June)
Basic science, curriculum in, Hartings and Counte, 824 (Oct.)
Behavioral science curricula in medical schools (*Communications*), Nadelson et al., 683 (Aug.)
Child abuse, interdisciplinary course in, for allied health students, Venters and ten Bensel, 334 (April)
Design of curriculum in ethics and human values in medicine, Keller, 107 (Feb.)
Development of curriculum (*Editorial*), Abrahamson, 778 (Sept.)
Empathy in the physician-patient relationship, training in, Fine and Therrien, 752 (Sept.)
Evaluation of undergraduate medical curriculum (*Communications*), Carter, 420 (May)
Flexible-time curriculum, Barbee and Dinham, 882 (Nov.)
Human sexuality, courses in (*Communications*), Lloyd and Steinberger, 74 (Jan.)
Human values in medicine (*Briefs*), Blizek and Finkler, 858 (Oct.)
Impact of curriculum on career choice of physicians, Fruen et al., 469 (June)
Independent study program, Geertsma et al., 123 (Feb.), As component of the clinical curriculum (*Communications*), Ruppert et al., 855 (Oct.); For first- and second-year medical students, Korst, 404 (May)
Interpersonal process recall, course in, for psychiatry residents (*Communications*), Benedek and Bienick, 939 (Nov.)

Interpersonal skills, course in, Grayson et al., 906 (Nov.)
Interviewing, practice-oriented course in, Hunter et al., 328 (April)
Modified systems program in a new medical school curriculum, Thompson, 316 (April)
Nutrition education in a six-year B.S.-M.D. program, Rao, 654 (July)
Pathology: Organization of a course in a Netherlands medical school, Helder et al., 648 (Aug.)
Radiation nephrology, undergraduate elective in (*Communications*), Schwartz and Rauch, 857 (Oct.)
Physical diagnosis: Experimental course for second-year medical students in outpatient setting, McGlynn et al., 840 (Oct.), Taught by fourth-year students (*Communications*), Rund et al., 520 (June)
Preparatory course for students lacking academic background, Ferrier and Hamilton, 390 (May)
Primary care: Course for first-year medical students (*Communications*), Grover et al., 338 (April), In a new three-year clinical medical school, Pittman and Barr, 982 (Dec.)
Problem-oriented curriculum, Echt and Chan, 681 (Aug.)
Psychiatry, curriculum development in, for students in primary care programs, Kinzie et al., 664 (Aug.)
Quality assurance, seminar in, Rosen and Rydich, 562 (July)
Review of curriculum, Levine et al., 478 (June)
Sex education for medical students, Lamberti and Chapel, 582 (July)
Six-year premedical-medical program: Actuarial prediction of performance (*Communications*), Hess and Brown, 68 (Jan.)
Special tutorial for minority students, Geertsma, 396 (May)
Student-run course in interprofessional relations, Boyer et al., 183 (March)
Three-year curriculum for teaching uses of language to medical students, Cassell and Skopek, 197 (March)
Three- and four-year curricula, comparison of clinical performance of students in, Hallock et al., 658 (Aug.), (*Letters to the Editor*), Peterson, 1020 (Dec.)
Venomous animals, program in, for third-year medical students, Daly, 811 (Oct.)

Datagrams:
Time of Decision to Study Medicine: Its Relation to Specialty Choice, Yancik, 78 (Jan.)
Medical Student Enrollment, 1972-73 Through 1976-77, Dubé, 164 (Feb.)
MCAT Performance by Selected Characteristics of Medical School Aspirants, Lane and Feitz, 219 (March)
COTRANS: An Update, Dubé, 369 (April)
Salaries of Strict Full-Time Faculty in U.S. Medical Schools, Laskoski, 436 (May)
Income Analysis of University-Owned Teaching Hospitals, Isaacs and Thomas, 529 (June)
State Roles in Financing Medical Education, Savoy, 607 (July)
State Government Payments to Out-of-State Medical Schools for Enrolling Their Residents, Savoy, 694 (Aug.)
Applicants for 1976–77 First-year Medical School Class, Gordon, 780 (Sept.)
COTH Survey of House Staff Policy, 1977, Checker and Dove, 863 (Oct.)
Family Income of Medical School Applicants and Acceptees and of College Students, Boehner, 948 (Nov.)
Applications Versus Acceptances to the 1976–77 First-Year Classof U.S. Medical Schools, Cuca, 1010 (Dec.)

Editorials:
The New Medical College Admission Test, Cooper, 77 (Jan.)
Whither International Health?, McGinnis, 161 (Feb.)
New Specialties, 218 (March)
Labor Relations Act Coverage for House Staff: Neither Necessary nor Desirable, 356 (April)
Continuing Education, Harrell (May)
The Evaluation of Administrative Performance, Ingersoll, (526) (June)
Local Institutional Review Boards, 604 (July)
Improving Access to Health Care: Incentives, Regulations, or Substitution?, McGinnis, 691 (Aug.)
Changing Curriculum in the Medical School, Abrahamson, 778 (Sept.)
Specialty Distribution and the COMP, 861 (Oct.)
The VA-Medical School Relationship, 946 (Nov.)
Professional Isolation, Peterson and Stoeckle, 1008 (Dec.)

Educational Technology: *See Also* Computers
Audiovisual resource lists (*Communications*), Brantz and Mulvaine, 937 (Nov.)
Flexible teaching hold, use of, in hypnosis (*Briefs*), Katz and Rabiah, 859 (Oct.)
Random-access videocassettes: Use of, in medical education (*Briefs*), O'Connor, 859 (Oct.)
Slide-tape program, use of, as alternative to lecture (*Communications*), Baggott et al., 367 (Feb.)

Stereoscopic slides, use of, in self-instruction in human gross anatomy, Prentice et al., 758 (Sept.)
Videotapes, use of: In assessing physical diagnosis skills (*Communications*), Stillman et al., 942 (Nov.); In improving teaching performance (*Communications*), Cassie et al., 353 (April); In teaching child psychiatry (*Communications*), Forgotson and Sweeney, 351 (April)

Evaluation:
Of administrative performance (*Editorial*), Ingersoll, 526 (June)
Of Arizona Medical Student Exchange Program, Navin and Nichols, 817 (Oct.)
Of child health associate program, Dungy and Sander, 413 (May)
Of clinical experiences of medical students, rural versus university settings, Garrard and Verby, 802 (Oct.)
Of clinical skills of residents in internal medicine, Futcher et al., 567 (July)
Of clinical training in the community, Gordon et al., 888 (Nov.)
Of competence in physical examination (*Communications*), Andrew, 589 (July)
Of course in human values in medicine (*Briefs*), Blizek and Finkler, 858 (Oct.)
Of educational needs in a community hospital, Davis, 749 (Sept.)
Of effectiveness of program to decrease excessive laboratory use, Eisenberg, 578 (July)
Of independent study program, Geertsma et al., 125 (Feb.); Korst, 411 (May)
Of instruction: in interpersonal skills, Grayson et al., 906 (Nov.); in physical diagnosis in outpatient setting, McGlynn et al., 840 (Oct.)
Of interdisciplinary course in child abuse and neglect, Venters and ten Bensel, 334 (April)
Of interviewing skills, Hutter et al., 328 (April)
Of medical school courses, by students (*Communications*), Dorwart, 679 (Aug.)
Of medical students (*Letters to the Editor*), Liebman, 540 (June)
Of a modified systems program in a Canadian medical school, Thompson, 319 (April)
Of a modularized system of instruction in pediatrics (*Communications*), Levine et al., 213 (March)
Of pediatrics clerkship training (*Communications*), Parcel et al., 429 (May)
Of peers, by male and female medical students (*Communications*), Roos et al., 346 (April)
Of preceptorship in primary care, Bouchard and Tufo, 508 (June)
Of quality of medical care, Rosen and Rudich, 562 (July)
Of resident competence, through medical record review, Schuller and Stotz, 133 (Feb.)
Of student progress in preparatory course for medical students, Ferrier and Hamilton, 390 (May)
Of surgical clerkship in community hospital, Dean and Johnson, 59 (Jan.)
Of teaching effectiveness, by students, Irby et al., 668 (Aug.); (*Letters to the Editor*), Ghozeil, 230 (March)
Of a teaching system in human gross anatomy, Prentice et al., 758 (Sept.)
Of an undergraduate medical curriculum (*Communications*), Carter, 420 (May)

Finances:
Cost containment as an element in graduate internal medicine training program, Reid and Lantz, 301 (April)
Costs of preceptorship in ambulatory primary care, Bouchard and Tufo, 513 (June)
Financial exigency as a reason for termination of a tenured appointment, Spellman and Meiklejohn, 623 (Aug.)
Financing medical education (*Letters to the Editor*), Nadel and Smith, 371 (April); (*Letters to the Editor*), Kalivas, 705 (Aug.)
Financing medical education: roles of the states (*Datagram*), 607 (July)
Funding for a health centers program of a community-based medical school, Pittman and Barr, 982 (Dec.)
Income-analysis of university-owned teaching hospitals (*Datagram*), Isaacs and Thomas, 528 (June)
Medical schools' financial data systems, Hilles et al., 493 (June)
Salaries of strict full-time faculty (*Datagram*), Laskoski, 436 (May)

Government: *See Also* Health Manpower Policy
Federal: Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (*Editorial*), 604 (July); Health Professions Educational Assistance Act of 1976 and the geographic maldistribution of physicians, Burke, 731 (Sept.); Health manpower legislation (*Editorial*), McGinnis, 691 (Aug.); Local institutional review boards (IRBs) (*Editorial*), 604 (July); Major features of a national health insurance plan, Davis, 35 (Jan.); The medical community and big government, Cronkhite, 19 (Jan.); (*Letters to the Editor*), Gibson and Beard, 442 (May); National Institutes of Health and misuse of language (*Letters to the Editor*), Ingall, 372 (April); National Labor Relations Act coverage for house staff (*Editorial*), 356 (April); National policy in the health sciences, Hamburg, 25 (Jan.); professional standards review organizations (PSROs), instruction in, for health administration students, Rosen and Rudich, 562 (July); Veterans Administration-medical school relationship (*Editorial*), 946 (Nov.); U.S. Congress—and health manpower policy, Burke, 731 (Sept.)
State: Arizona Medical Student Exchange Program of the Western Interstate Commission for Higher Education (WICHE), Navin and Nichols, 817 (Oct.); Court rulings on special admissions programs, Burke, 731 (Sept.); Role of the states in financing medical education (*Datagram*), Savoy, 607 (July)

Health Care: *See Also* Primary Care
Accessibility of, and federal health manpower legislation (*Editorial*), McGinnis, 691 (Aug.)
Comprehensive health care: The problem-oriented medical record (POMR) model (*Communications*), Smilkstein, 773 (Sept.)
Consumer perceptions of, Doyle and Ware, 793 (Oct.)
Delivery of, and continuing medical education, Davis, 745 (Sept.)
Health maintenance organization, development of, Giacalone and Hudson, 971 (Dec.)
In rural settings: Area Health Education System (AHES) in Kentucky, Polk, 633 (Aug.); Recruitment of physicians, Korman and Feldman, 308 (April); Predictors of physician choice of rural practice, Kegel-Flom, 204 (March)
Quality Assurance: Analysis of quality of care, Rosen and Rudich, 562 (July); Program in a medical school (*Communications*), Garg et al., 514 (June); Student audits of ambulatory care, Pittman and Barr, 982 (Dec.)

Health Care Systems:
Saudi Arabia: King Faisal Specialist Hospital and Research Center (*Letters to the Editor*), Awais and Awais, 870 (Oct.)
United States: Recent achievements of the U.S. health care system, Davis, 33 (Jan.)

Health Manpower Policy: *See Also* Government
Arizona Medical Student Exchange Program, Navin and Nichols, 817 (Oct.)
Attitudes of black university undergraduates toward opportunities in the health professions (*Communications*), 847 (Oct.)
Career patterns of physicians, Giacalone and Hudson, 971 (Dec.)
Federal health manpower legislation and access to health care (*Editorial*), McGinnis, 691 (Aug.)
Geographic distribution of physicians: Provisions of Health Professions Educational Assistance Act of 1976, Burke, 731 (Sept.); Factors influencing rural location of physicians (*Communications*), Grimes et al., 771 (Sept.); Wives' influence on location choices of physicians (*Communications*), Skipper and Gliebe, 764 (Sept.); Encouragement of rural practice through program for third-year medical students, Garrard and Verby, 802 (Oct.); Myth of professional isolation, Ducker, 991 (Dec.); Professional isolation (*Editorial*), Peterson and Stoeckle, 1008 (Dec.)

History:
AAMC: Looking Ahead from the First Hundred Years, Cooper, 11 (Jan.)
Emergence of the family practitioner, Lewy, 873 (Nov.)
Training of family physicians (*Letters to the Editor*), Harrell, 621 (July)

Human Values and Ethics:
Accelerating pace of technical advance, Cronkhite, 22 (Jan.) Course in human values in medicine (*Briefs*), Blizek and Finkler, 858 (Oct.)
Curriculum in, Keller, 107 (Feb.)
Humanities in medical education (*Communications*), Clouser, 930 (Nov.)
Holistic educational approach in a Netherlands medical school, Helder et al., 648 (Aug.)
Medical students: Changes in attitudes toward cancer, Haley et al., 500 (June); In course in human values (*Briefs*), Kepler, 160 (*Briefs*)

Laboratories:
House staff's use of prothrombin time determination, Eisenberg, 578 (July)
Use of, in teaching hospitals (*Communications*), Schroeder and O'Leary, 418 (May)

Letters to the Editor:
176 (Feb.), 230 (March), 371 (April), 442 (May), 540 (June), 619 (July), 705 (Aug.), 870 (Oct.), 957 (Nov.), 1020 (Dec.)

Libraries:
Audiovisual resource list (*Communications*), Brantz and McIlvaine, 937 (Nov.)
Quality filter method for papers (*Communications*), Boyce and Primov, 1061 (Dec.)

BIBLIOTECA CENTRAL

Medical Education:
Behavioral science in medical education (*Communications*), Nadelson et al., 683 (Aug.); Two-year behavioral science curriculum, Hartings and Counte, 829 (Oct.)
Educational mission of a medical school, Levine et al., 478 (June)
Family nurse practitioner as teacher in medical education, Andrus et al., 896 (Nov.)
Financing medical education (*Letter to the Editor*), Nadel and Smith, 371 (April)
Humanistic medicine as taught in a Netherlands medical school, Helder et al., 648 (Aug.)
Independent study program as a component of the clinical curriculum (*Communications*), Ruppert et al., 855 (Oct.)
Students' role changes at various levels of medical education, Grubbs, 190 (March)
Trends in primary care education, Giacalone and Hudson, 971 (Dec.)

Medical Education Abroad:
Mexico: Predominant country of origin of "fifth pathway" students, Stimmel and Smith, 484 (June)
Netherlands: Holistic medical education, Helder et al., 648 (Aug.)
Nigeria: Career choices of medical students (*Communications*), Erinosho, 215 (March)

Medical Education—Postgraduate:
Graduate medical education (GME) positions: Distribution and the CCME (*Editorial*), 861 (Oct.)
House officers: Career plans of internal medicine house staff (*Communications*), Marienfeld, 853 (Oct.); Program to limit laboratory use by house staff, Eisenberg, 578 (July)
Interns/Internship: Performance of lumbar puncture (*Communications*), Aloia et al., 689 (Aug.)
Medical record review in postgraduate medical education, Schuller and Stotz, 133 (Feb.)
NIRMP (National Intern and Resident Matching Program): Matching of "fifth pathway" students, Stimmel and Smith, 484 (June); Service to medical students and program directors (*Letters to the Editor*), Graettinger, 176 (Feb.); Supply of GME-1 positions available to U.S. medical students, Graettinger, 375 (May)
Residents/Residency: Evaluation of clinical skills, Futcher et al., 567 (July); House call training in a family practice program (*Communications*), Warburton and Sadler, 768 (Sept.); In emergency medicine, Anwar and Wagner, 55 (Jan.); In family practice, Lewy, 878 (Nov.); (*Briefs*), Podell and Keller, 160 (Feb.), (*Communications*), Geyman, 999 (Dec.); (*Communications*), London and Green, 140 (Feb.); In an internal medicine consultation service, Moore et al., 323 (April); In psychiatry (*Communications*), 939 (Nov.); Participation of family nurse practitioners in resident education, Andrus et al., 898 (Nov.); Primary care program, assuring continuity of care, Hodge and Reid, 739 (Sept.); Time-study of residents, Pierson et al., 555 (July)

Medical Faculty:
Attitudes of: Toward independent study program, Geertsma et al., 127 (Feb.); Korst, 404 (May); Toward a modified systems program, Thompson, 316 (April)
Clinical faculties, academic tenure for, Spellman and Meiklejohn, 623 (Aug.)
Continuity among department chairmen (*Communications*), Checker, 766 (Sept.)
In an undergraduate primary care education program, Pittman and Barr, 982 (Dec.)
Organization of a behavioral science faculty, Hartings and Counte, 826 (Oct.)
Role expectation, Otis, 39 (Jan.)
Salaries of strict full-time (*Datagram*), Laskoski, 436 (May)
Women faculty members: Office for Women, a new medical school program (*Communications*), Finseth, 928 (Nov.)

Medical Journals:
Pao's selection method for quality papers (*Communications*), Boyce and Primov, 1001 (Dec.)
Publication of articles, Comroe, 9 (Jan.)

Medical Schools:
Academic tenure for clinical faculties, Spellman and Meiklejohn, 623 (Aug.)
Applicants for, 1975-76 first-year class, annual study, Gordon and Johnson, 707 (Sept.)
Class size, and medical school characteristics (*Communications*), Sedlacek, 138 (Feb.)
Consumer health education in (*Communications*), 587 (July)
Continuing medical education programs in (*Communications*), Mason and Kappelman, 341 (April)
Cooperative program with community college (*Communications*), Tworek, 143 (Feb.)
Department chairmen, continuity among (*Communications*), Checker, 766 (Sept.)
Internal information systems in, Hilles et al., 489 (June)
Internal review process in, Levine et al., 483 (June)

Minority admissions: Problems and opportunities, Burke, 731 (Sept.)
Obstetrics/gynecology departments, 1965-75, national survey, Spellacy et al., 901 (Nov.)
Office for Women, a medical school program (*Communications*), Finseth, 928 (Nov.)
Trends in primary care education, Giacalone and Hudson, 971 (Dec.)
Veterans Administration-medical school relationship (*Editorial*), 946 (Nov.)

Medical Schools by Name:
Australia: Adelaide, 685 (Aug.)
Canada: McMaster, 1002 (Dec.); Manitoba, 420 (May); Toronto, 494 (June)
Mexico: Guadalajara, 484 (June)
Netherlands: Erasmus, 648 (Aug.)
United States: Albany, 143 (Feb.); Arizona, 818 (Oct), 882 (Nov.); Arkansas, 811 (Oct.); Buffalo, 117 (Feb.), California—San Diego, 293 (April); Colorado, 293 (April), 328 (April); Connecticut, 687 (Aug.); South Florida, 658 (Aug.); George Washington, 177 (May), 776 (Sept.); Hahnemann, 591 (July); Harvard, 834 (Oct.); Hawaii, 664 (Aug.); Illinois, 475 (June); Indiana, 459 (June); Iowa, 674 (Aug.); Jefferson, 99 (Feb.), Louisville, 633 (Aug.); Medical College of Ohio, 514 (June), 764 (Sept.); Medical College of South Carolina, 107 (Feb.); Michigan State, 681 (Aug.), 920 (Nov.); Missouri, 582 (July); Minnesota, 802 (Oct.); Mount Sinai, 145 (Feb.), 562 (July), 600 (July); North Carolina, 602 (July); New Jersey-New Jersey Medical School, 587 (July); New Jersey-Rutgers, 522 (June), 768 (Sept.); Pennsylvania State, 323 (April), 620 (July), 840 (Oct.); Ohio State, 384 (May), 855 (Oct.); Saint Louis, 89 (Feb.); Southern Illinois, 149 (Feb.); Stanford, 520 (June); Texas—Galveston, 478 (June); Texas—Houston, 595 (July); Tulane, 679 (Aug.); Virginia, 739 (Sept.); Vermont, 508 (June); Washington, 888 (Nov.); Wisconsin, 404 (May); Yale, 928 (Nov.)

Medical Students:
Attitudes of: Toward cancer, Haley et al., 500 (June); Toward community health center program, Pittman and Barr, 982 (Dec.); Toward independent study program, Korst, 404 (May); Toward instructional system in medical school, Levine et al., 483 (June); Toward quality assurance (*Communications*), Garg et al., 514 (June); Toward 13 selected items, Coe et al., 89 (Feb.)
Biases of, in interviewing patients, Breyspraak et al., 47 (Jan.)
Career choice of: Differences between male and female students, McGrath and Zimet, 293 (April); From medical/nonmedical families, Gough and Hall, 541 (July); General practice, attrition from, Fruen et al., 494 (June); Goals of medical students in Nigeria (*Communications*), Erinosho, 215 (March); Preferences versus choices in selection of specialties, Matteson and Smith, 548 (June)
COTRANS: Transfer of U.S. foreign medical students to U.S. medical schools via Coordinated Transfer Application System (COTRANS) (*Datagram*), Dubé, 359 (April)
Course in interprofessional relations designed by, Boyer et al., 183 (March)
Enrollment of: 1972-73 through 1976-77 (*Datagram*), Dubé, 164 (Feb.) First-year: Decreasing liberalism, Coe et al., 89 (Feb.); In health maintenance organization-based primary care program (*Communications*), Grover et al., 338 (April)
Fourth-year: As teachers of course in physical diagnosis (*Communications*), Rund et al., 520 (June); In primary ambulatory care rotation, Bouchard and Tufo, 510 (June)
In Arizona Medical Student Exchange Program, Navin and Nichols, 817 (Nov.)
In a continuing clerkship, Gordon et al., 888 (Nov.)
In "fifth pathway" programs in New York state schools, Stimmel and Smith, 484 (June)
In interpersonal skills training program, Fine and Therrien, 752 (Sept.)
In outreach activity of pediatric clerkship (*Communications*), Parcel et al., 429 (May)
In special preparatory course in biological science, Ferrier and Hamilton, 390 (May)
In summer project on child abuse (*Communications*), Hansen, 522 (June)
In surgical clerkships in community hospital, Dean and Johnson, 59 (Jan.)
In third- and fourth-year curricula, a comparison of clinical performance, Hallock et al., 658 (Aug.)
Interprofessional training of, McCalley et al., 177 (March)
Interviewing skills of: Instruction in uses and functions of language, Cassell and Skopek, 197 (March)
Minority, special tutorial course for, Geertsma, 396 (May)
Performance of: From medical/nonmedical families, Gough and Hall, 541 (July); Self- versus peer-assessments (*Communications*), Roos et al., 345 (April)
Reading skills of, relationship to medical school success (*Communications*), Entwisle and He-

bel, 72 (Jan.)
Role relationships of, with faculty, Otis, 38 (Jan.)
Second-year: In independent study program, 123 (Feb.), Program of instruction in physical diagnosis in outpatient setting, McGlynn et al., 840 (Oct.)
Selection of: Computer-assisted admissions process, Williams et al., 384 (May); Prediction of grade-getting ability (*Communications*), McGuire, 416 (May)
Sex education for, Lamberti and Chapel, 582 (July)
Specialty choice of: relationship to time of decision to study medicine (*Datagram*), Yancik, 78 (Jan.); Results of longitudinal study, Herman and Veloski, 99 (Feb.)
Third-year: Comparison of clinical experiences in rural and university settings, Garrard and Verby, 802 (Oct.); Four-week clerkship in community medicine (*Communications*), Stewart et al., 145 (Feb.); In Area Health Education System (AHES) surgical program, Polk, 633 (Aug.); In combined perinatal clerkship (*Communications*), Trygstad and Buster, 944 (Nov.)
Women students: Career choice of, Herman and Veloski, 99 (Feb.); Office for Women, program at a medical school (*Communications*), Finseth, 928 (Nov.); Personality traits of women medical students and other women student health professionals, Rezler and Buckley, 475 (June); Role models in medical school, Roeske and Lake, 459 (June); Self-perceptions of women students (*Communications*), Roos et al., 345 (April); Specialty choices of, McGrath and Zimet, 293 (April)

Medicine:
Education in humanistic medicine in a Netherlands medical school, Helder et al., 648 (Aug.)
Language as a tool in medicine, Cassell and Skopek, 197 (March)
The medical community and big government, Cronkhite, 19 (Jan.); (*Letter to the Editor*), Gibson and Beard, 442 (May)
Relation of time of decision to study medicine to choice of a medical specialty (*Datagram*), Yancik, 78 (Jan.)

Patient Care: *See Also* Health Care, Primary Care
Continuity of care in a residency program, Hodge and Reid, 739 (Sept.)
In rural clinical program for third-year medical students, Garrard and Verby, 802 (Oct.)
Quality assurance: Program for medical students (*Communications*), Garg et al., 514 (June)

Physicians:
Attitudes of, toward nonurban practice, Ducker, 991 (Dec.)
Career decisions of: Relation to medical schools attended (*Briefs*), Potchen et al., 602 (July); Wives' influence on (*Communications*), Skipper and Gliebe, 764 (Sept.); (*Letters to the Editor*), Sarty, 1020 (Dec.)
Community physicians and ratings of primary care tasks (*Communications*), Sachs, 932 (Nov.)
General practice as career choice, Fruen et al., 494 (June)
Geographic distribution of: Area Health Education System (AHES), Polk, 633 (Aug.); Study of factors influencing (*Communications*), Grimes et al., 771 (Sept.); Myth of professional isolation, Ducker, 991 (Dec.); Professional isolation (*Editorial*), Peterson and Stoeckle, 1008 (Dec.)
Management development courses for (*Communications*), Plovnick, 516 (June)
Migration of (*Letter to the Editor*), Neufeld, 230 (March)
Recruitment of, into rural areas, Korman and Feldman, 308 (April)
Training in use of protocol for patient instructions (*Communications*), Bursztajn, 347 (April)
Women physicians: Personality changes over time, Cartwright, 467 (June); Role models for women medical students, Roeske and Lake, 459 (June)

Premedical Students:
Advisers to (*Communications*), Bruhn, 676 (Aug.)
Attrition of women in premedical years (*Communications*), Staley and Hood, 849 (Oct.)
Cooperative college-hospital program for (*Communications*), Norman et al., 147 (Feb.)
Minority: Enrichment programs, Burke, 733 (Sept.)
Predictions of grade-getting ability in medical school (*Communications*), McGuire, 416 (May)

Primary Care: *See Also* Health Care and Specialties (Family Medicine)
Education in, trends in medical schools and teaching hospitals, Giacalone and Hudson, 971 (Dec.)
Health maintenance organization (HMO) based undergraduate program (*Communications*), Grover et al., 338 (April)
House call training in residency programs (*Communications*), Warburton and Sadler, 768 (Sept.)
In rural areas: Evaluation of Arizona exchange program, Navin and Nichols, 817 (Oct.); Health manpower project, Pinchoff et al., 117 (Feb.); Predictors of choice of rural practice, Kegel-Flom, 204 (March)
Management course for physicians in primary care settings (*Communications*), Plovnick, 516 (June)
Psychiatric instruction in a primary care curriculum, Kinzie et al., 664 (Aug.)
Quality assurance: Audit of medical care in primary care practices, Bouchard and Tufo, 508 (June)
Small Community Medicine Education Program (*Briefs*), Stone et al., 602 (July)
Tasks rated by medical students and community physicians (*Communications*), Sachs, 932 (Nov.)
Trends in medical students' interest in primary care specialties, Herman and Veloski, 99 (Feb.)
Training for primary care: Continuity of care in residency programs, Hodge and Reid, 739 (Sept.)

Research:
Biomedical: Evolution of clinical advances, Comroe, 3 (Jan.); Protection of human subjects (*Editorial*), 604 (July); Relation of research to contemporary health dilemmas, Hamburg, 25 (Jan.)

Specialties:
Communication among specialties, (*Briefs*), Lake, 354 (April)
Dermatology, problem-solving simulations in (*Communications*), 598 (July)
Emergency medicine, development of, Anwar and Wagner, 55 (Jan.)
Establishment of new specialties (*Editorial*), 218 (March)
Family medicine: "Appropriate" tasks for family physicians (*Communications*), London and Green, 140 (Feb.); As career choice of medical students, Herman and Veloski, 99 (Feb.); Educational program in family medicine (*Letter to the Editor*), Harrell, 620 (July); Historical analysis of new specialty, Lewy, 873 (Nov.); In rural North Carolina (*Briefs*), Stone et al., 602 (July); Programs in family medicine, Giacalone and Hudson, 971 (Dec.); Residency training (*Communications*), Geyman, 999 (Dec.)
General internal medicine: Career plans of house officers (*Communications*), Marienfeld, 853 (Oct.)
Internal medicine: Evaluation of clinical skills of residents, Futcher et al., 567 (July); Consultation service in a medical center, Moore et al., 323 (April)
Primary care specialties: Supply of GME-1 places, Graettinger, 375 (May)
Psychiatry: Clinical clerkship—and development of primary care physicians, Kinzie et al., 664 (Aug.)
Representation of specialties on hospital continuing medical education committees (*Communications*), DeLuca, 926 (Nov.)
Specialty distribution and the CCME (*Editorial*), 861 (Oct.)
Specialty selection: By male and female medical students, McGrath and Zimet, 293 (April); By students from medical/nonmedical families, Gough and Hall, 545 (July); Choice and preference differences, Matteson and Smith, 548 (July)
Surgery: Area Health Education System (AHES) program in the surgical sciences, Polk, 633 (Aug.)

Study(ies):
Of physician attrition—from careers in general practice, Fruen et al., 494 (June)
Of women student attrition—from careers in medicine, in premedical years (*Communications*), Staley and Hood, 849 (Oct.)
Of career plans of house officers in internal medicine (*Communications*), Marienfeld, 853 (Oct.)
Of consumer perceptions of medical care, Doyle and Ware, 793 (Oct.)
Of effectiveness of teaching in clinical surgery (*Communications*), Hill et al., 595 (July)
Of house staff performance in university clinic, Reid and Lantz, 301 (April)
Of internal medicine consultation programs in academic medical centers, Moore et al., 323 (April)
Of interprofessional education, McCally et al., 177 (Feb.)
Of medical schools' internal information systems, Hilles et al., 489 (June)
Of medical students: As clinical teachers (*Communications*), Rund et al., 520 (June); Attitudes toward cancer, Haley et al., 500 (June); Trends toward decreasing liberalism, Coe et

al., 89 (Feb.); Interest in primary care specialties, Herman and Veloski, 99 (Feb.); From medical/nonmedical families, Gough and Hall, 541 (June)
Of practice location decisions (*Communications*), Grimes et al., 771 (Sept.)
Of "proper" tasks for family physicians (*Communications*), 140 (Feb.)
Of rater confidence in providing performance ratings, Dowaliby, 914 (Nov.)
Of recruitment of physicians into rural areas, Korman and Feldman, 308 (April)
Of relevance of study of anatomy to the practice of medicine, Casady and Hillman, 210 (March)
Of residents in family practice program, Pierson et al., 555 (July)
Of role expectations of medical faculty, Otis, 39 (Jan.)
Of specialty selection, preference versus choice, Matteson and Smith, 548 (June)
Of videotapes in clinical teaching (*Communications*), Cassie et al., 353 (April)

Teaching Hospitals:
Attending clinic for primary care patients, Hodge and Reid, 739 (Sept.)
Community hospital as site of surgical clerkships, Dean and Johnson, 59 (Jan.)
Continuing medical education within a local, community hospital, Davis, 745 (Sept.)
House staff policy: AAMC Council of Teaching Hospitals survey (*Datagram*), Checker and Dove, 863 (Oct.)
Income-analysis of university-owned teaching hospitals (*Datagram*), Isaacs and Thomas, 521 (June)
Labor relations act coverage for house staff (*Letter to the Editor*), Malish, 870 (Oct.)
Laboratory use in teaching hospitals: Comparison with community hospitals (*Communications*), Schroeder and O'Leary, 418 (May); Program to modify use by house staff physicians, Eisenberg, 578 (July)
Service versus education in neonatal intensive care (*Briefs*), Squire et al., 859 (Oct.)
Trends in residency programs in primary care specialties, Giacalone and Hudson, 971 (Dec.)

Teaching Methods:
Clinical teaching workshop, Stritter and Hain, 155 (Feb.)
Contemporary music as aid in teaching psychiatry (*Communications*), Egan 151 (Oct.)
Course director model of instruction, Hartings and Counte, 829 (Oct.)
Interviewing: Decision to take notes (*Communications*), May and Miller, 524 (June); Impression formation process, Breytspraak et al., 47 (Jan.); Skill training in empathy in physician-patient relationship, Fine and Therrien, 752 (Sept.); Teaching and evaluation, Hutter et al., 328 (April); Teaching interpersonal skills, Grayson et al., 906 (Nov.)
Personalized Study Program, teaching psychiatry by (*Communications*), Gregory et al., 427 (May)
Physical diagnosis: Experimental course in outpatient environment, McGlynn et al., 840 (Oct.); Medically significant odors (*Communications*), Lukas, 349 (April); Use of Bayesian Diagnostic Model (HEME) (*Communications*), Friedman et al., 935 (Nov.); Use of computer in teaching (*Communications*), Goroll et al., 153 (Feb.)
Physical examination: Teaching with "practical instructions" (*Communications*), Frazer and Miller, 149 (Feb.)
Problem-based learning: Portable patient problem pack (*Communications*), Barrows and Tamblyn, 1002 (Dec.)
Problem-solving simulations as self-assessment technique (*Communications*), 598 (July)
Self-instruction: Comparison analysis, self-instruction versus lecture (*Communications*), de Carvalho et al., 212 (March); Independent Study Program for first- and second- year students, Korst, 404 (May); In human gross anatomy, Prentice et al., 758 (Sept.)
Simulated patients: For research in physician-patient communication (*Communications*), Adler, 151 (Feb.); (*Letter to the Editor*), Naftulin, 705 (Aug.); Use of student's "partner" for pelvic examinations (*Communications*), Schneidman, 70 (Jan.); (*Letter to the Editor*), Greenman, 619 (July)
Small-group discussion sessions (*Communications*), Lee, 432 (May) Special tutorial for minority students, Geertsma, 396 (May)
Structure guidance outside formal courses (*Communications*), Chernick, 591 (July)
Teaching clinical surgery: Bedside versus seminar room (*Communications*), Hill et al., 595 (July)
Three-dimensional model, in teaching embryology (*Communications*), Bressler, 600 (July)
Use of nonphysician women instructors in teaching the pelvic examination, Billings and Stoeckle, 834 (Oct.)

Tests:
Educational Commission for Foreign Medical Graduates (ECFMG) examinations: As certification requirement for "fifth pathway" students, Stimmel and Smith, 484 (June)
Grade-getting ability of medical students: Tests as predictors, (*Communications*), McGuire, 416 (May); (*Communications*), Reid and Blain, 66 (June)
Medical College Admission Test (MCAT): Economic and racial disadvantage as reflected in traditional selection factors, Waldman, 961 (Dec.); Performance on, by selected characteristics of medical school aspirants (*Datagram*), Lane and Feitz, 218 (March); Scores on, as factor in selection of medical students, Williams et al., 386 (May)
New Medical College Admission Test (New MCAT) (*Editorial*), Cooper, 77 (Jan.)
National Board of Medical Examiners (NBME) examination: Impact on scores of Personalized Study Program (*Communications*), Gregory et al., 427 (May); Part I, performance on, by students in independent study program, Korst, 404 (May); Scores of medical students in flexible-time curriculum, Barbee and Dinham, 882 (Nov.); Use of, in comparison of performance of students in third- and fourth-year curricula, Hallock et al., 658 (Aug.)
Truax Accurate Empathy Scale, use of, in empathy training, Fine and Therrien, 752 (Sept.)

Universities:
Attitudes of black university undergraduates toward opportunities in the health professions (*Communications*), Bruhn and Hrachovy, 847 (Oct.)
Role of the AAMC in relation to, Cooper, 18 (Jan.)

World Health:
British Life Assurance Trust Centre for Health and Medical Education (*Letter to the Editor*), 1020 (Dec.)
International health programs (*Editorial*), McGinnis, 161 (Feb.) Physician migration (*Letter to the Editor*), Neufeld, 230 (March) World Health Organization (WHO): Expert Committee on General Practice, Lewy, 873 (Nov.)

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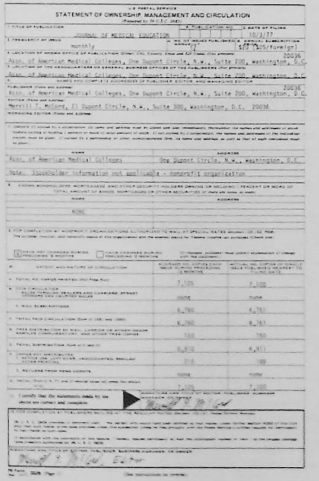
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