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Admissions: Academic preparation

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ADMISSIONS

ACADEMIC PREPARATION

**REEXAMINATION OF RELATIONSHIPS BETWEEN STUDENTS'
UNDERGRADUATE MAJORS, MEDICAL SCHOOL PERFORMANCES,
AND CAREER PLANS AT JEFFERSON MEDICAL COLLEGE**

Hidemichi Ashikawa, Mohammadreza Hojat, Carter Zeleznik, Joseph S. Gonnella

A reexamination of the possible relationships between medical students' undergraduate academic majors and their medical school performances and career plans seems appropriate, given the continuing changes in the characteristics of the medical school applicant pool in the last several years. This study investigated these relationships by comparing cognitive and noncognitive characteristics of medical students who had different undergraduate majors. The study sample consisted of 812 students who entered Jefferson Medical College between 1985 and 1988. They were classified into six categories based on their undergraduate majors: biological, chemical and physical, social and behavioral, other sciences, humanities and arts, and indeterminate majors. Results indicated that performances in the basic science component of medical education were about the same for students with different undergraduate majors. The groups had similar rates of delayed graduation, but the attrition rate was highest for students who had majored in humanities and arts. The students in undergraduate disciplines traditionally oriented toward medicine (biological, physical, and chemical sciences) were younger and had made the decision to become a physician at earlier ages than had their counterparts with undergraduate majors in social sciences and humanities. Also, the groups differed with regard to their estimates of their future incomes and plans for professional activities after graduation. Similarities concerning the students' preferred professional activities were also noticed among the groups.

Academic Medicine. 1991; 66:458-464.

**THE JEFFERSON-PENN STATE B.S. - M.D. PROGRAM:
A 26-YEAR EXPERIENCE**

*Clara A. Callahan, J. Jon Veloski, Gang Xu, Mohammadreza Hojat, Carter Zeleznik,
Joseph S. Gonnella*

Since the 1960's a number of physicians have completed both their baccalaureate and their M.D. degrees in six or fewer years. In this longitudinal study the authors track the academic performances, clinical ratings, and career follow-up data of 659 students in one of these accelerated programs, the Jefferson Medical College—Pennsylvania State University B.S.–M.D. program, from entering years 1964 through 1989. The medical school performances, clinical performances in residencies, and rates of board certification and faculty appointment of the accelerated students compared favorably with those of a control group of medical students with similar high school credentials who had followed a four-year baccalaureate program. The authors conclude that a carefully chosen group of students can achieve high academic standards in an accelerated medical school program, graduate as younger physicians able to perform well in postgraduate training, and go on to highly productive careers in medicine.

Academic Medicine. 1992; 67(11):792-797.

Reprinted (in Chinese) International Medicine. 1993; 3:137-183.

EVALUATION OF AN ENRICHMENT PROGRAMME FOR ENTERING MEDICAL STUDENTS PREDICTED TO BE IN NEED OF ACADEMIC PREPARATION

Karen Glaser, Mohammadreza Hojat, Clara A. Callahan

Purpose: To evaluate a prematriculation enrichment programme offered to entering medical school students who were predicted to be in need of academic preparations.

Methods: A total of 585 students who entered Jefferson Medical College between 1988 and 1990 were divided into three groups: 70 were invited and completed the programme, 27 declined the invitation and 488 were not invited. Invitation was based on regression models predicting performance in medical school based on prior undergraduate grade point averages and medical college admission test scores.

Results: No significant differences were observed in the academic performance of students who completed the programme and those who declined to participate. The lack of such differences could be attributed to the greater age of those who participated. Participants expressed satisfaction with the programme.

Conclusions: A predicted risk model to identify students who are in need of additional academic preparation is an effective approach. There might be a 'sleeper effect' of the prematriculation programme, and therefore long-term evaluation of the programme was suggested.

Education for Health. 1996; 9: 221-228.

**PREMEDICAL TRAINING, PERSONAL CHARACTERISTICS
AND PERFORMANCE IN MEDICAL SCHOOL**

Mary W. Herman, J. Jon Veloski

The study compares attrition rates and clinical competence levels of medical students with variations in premedical training, age, and sex to determine the risks attached. No differences were found in levels of clinical competence, although groups varied in average science scores on the Medical College Admission Test (MCAT). Students with non-science undergraduate majors scored lower on this test than did science majors. Younger women had relatively high attrition rates but high performance on the MCAT science subtest and medical school science courses. While the study shows that students who are older or younger than average may have more problems that are not strictly academic, no relationships were found between premedical training and clinical competence. It was concluded that all groups in the study were adequately prepared in the basic sciences for medical school. The risk of producing physicians who are not clinically competent would not be increased by accepting students with lower science scores.

Medical Education. 1981; 15: 363-367.

**POSTBACCALAUREATE PREPARATION AND PERFORMANCE
IN MEDICAL SCHOOL**

Mohammadreza Hojat, Robert S. Blacklow, Mary R. Robeson, J. Jon Veloski, Bette D. Borenstein

The question whether postbaccalaureate preparation before matriculation in medical school contributes to medical students' performance was addressed by this study. A total of 610 (91%) of the students who entered Jefferson Medical College between 1985 and 1987 were the study sample. Fifty-eight of these students had taken nondegree undergraduate premedical courses and 15 had taken nondegree graduate courses. Fourteen students held graduate degrees and 60 students had some combination of the aforementioned types of postbaccalaureate preparations. The other 463 students had not taken postbaccalaureate courses. Grades received in medical school courses such as anatomy, biochemistry, mechanisms of disease, physiology, microbiology, pathology and pharmacology, as well as total scores on Part I of the National Board of Medical Examiners examination, were selected as performance variables.

Statistical analyses showed that the students who had taken nondegree postbaccalaureate courses had lower undergraduate grade-point averages than those without such courses and received lower grades on some measures of performance in medical school. The students with such additional academic backgrounds were also older than the average medical student. When adjustments were made for undergraduate grade-point averages by applying analysis of covariance, the observed differences that favored the group without postbaccalaureate preparation either became nonsignificant or favored those with such preparation. The differences favoring those without postbaccalaureate preparation could be accounted for mostly by these students' higher undergraduate grade-point averages and younger ages. Implications for admission decisions with regard to the changing applicant pool are discussed.

Academic Medicine. 1990; 65:388-391.

Also in Proceedings of the Twenty-seventh Annual Conference on Research in Medical Education, Chicago, IL, November 1988; 310-315.

**EVALUATION OF A SELECTIVE MEDICAL SCHOOL ADMISSIONS
POLICY TO INCREASE THE NUMBER OF FAMILY PHYSICIANS IN
RURAL AND UNDERSERVED AREAS**

Howard K. Rabinowitz

Jefferson Medical College initiated the Physician Shortage Area Program (PSAP) in 1974; this program preferentially admits medical school applicants from rural backgrounds who intend to practice family medicine in rural and underserved areas.

Evaluation of the program has shown that PSAP graduates from the classes of 1978 to 1985 have performed slightly less well than their peers (non-PSAP) during medical school, although there was no difference in attrition between the two groups. Nor did the performance of PSAP and non-PSAP graduates differ during their postgraduate training.

PSAP graduates from the classes of 1978 to 1981 were almost five times as likely as non-PSAP graduates to practice family medicine (59.6 vs 12.6 percent, $P<0.001$), three times as likely to practice in rural areas (37.8 to 42.2 percent vs. 10.0 to 11.8 percent, $P<0.001$), and two to four times as likely to practice in areas where there is a physician shortage (26.7 to 40.0 percent vs. 9.2 to 11.2 percent, $P<0.01$). They were 7 to 10 times as likely as their peers to combine a career in family medicine with practice in a rural or underserved area (24.4 to 31.1 percent vs. 3.1 to 3.9 percent, $P<0.001$), thereby fulfilling the goals of the PSAP.

This study concludes that the medical school admissions process can have a major influence on the specialty choice and geographic practice location of physicians, and suggests one mechanism for increasing the number of family physicians in rural and underserved areas.

The New England Journal of Medicine. 1988; 319:480-486.

Also in Proceedings of the Twenty-sixth Annual Conference on Research in Medical Education, Washington, DC, November 1987; 157-162.

**A PROGRAM TO RECRUIT AND EDUCATE MEDICAL STUDENTS TO
PRACTICE FAMILY MEDICINE IN UNDERSERVED AREAS**

Howard K. Rabinowitz

In an attempt to address the problem of physician maldistribution, Jefferson Medical College initiated the Physician Shortage Area Program (PSAP) in 1974, a special admissions program that preferentially selects applicants who intend to practice family medicine in physician shortage areas in Pennsylvania. Forty-seven students in four classes have been graduated from the program. Evaluation of these students during medical school shows that their academic performance has been similar to their classmates. Follow-up evaluation indicates that PSAP graduates are five times as likely as their peers (non-PSAP) to enter a family medicine residency program during the first postgraduate year (62 percent versus 12 percent), and almost twice as likely to enter family medicine as a comparable group of non-PSAP students who originally entered Jefferson with plans of becoming a family physician (62 percent versus 33 percent).

The Journal of the American Medical Association. 1983; 249(8):1038-1041.

DEMOGRAPHIC, EDUCATIONAL AND ECONOMIC FACTORS RELATED TO RECRUITMENT AND RETENTION OF PHYSICIANS IN RURAL PENNSYLVANIA

Howard K. Rabinowitz, James J. Diamond, Mohammadreza Hojat, Christina E. Hazelwood

While prior studies have identified a number of factors individually related to physician practice in rural areas, little information is available regarding the relative importance of these factors or their relationship to rural retention. Extensive data previously collected from the Jefferson Longitudinal Study were analyzed for 1972-1992 graduates of Jefferson Medical College (JMC) practicing in Pennsylvania in 1996, as were recent self-reported perceptions of JMC graduates in rural practice. Rural background was overwhelmingly the most important independent predictor of rural practice, and freshman plans to enter family practice was the only other independent predictor. No other variable, including curriculum or debt, added significantly to the likelihood of rural practice. None of these variables, however, including rural background, were predictive of retention, which appeared to be more related to practice issues such as income and workload. The results suggest not only that increasing the number of physicians who grew up in rural areas is the most effective way to increase the number of rural physicians, but that any policy that does not include this may be unsuccessful.

The Journal of Rural Health. 1999; 15:212-218.

**USING POSTGRADUATE CLINICAL PERFORMANCE TO MONITOR
CHANGE IN THE MEDICAL SCHOOL**

J. Jon Veloski

To study the impact of curricular changes and changes in admission policy upon the performance of Jefferson graduates, three stages of analysis were used to address each issue. The first stage was the multivariate analysis of variance comparing the appropriate groups simultaneously on four areas of competence, followed by one-way analysis of variance and post-hoc tests.

To determine the effect of an increase in the number of female medical school graduates, data were analyzed on all women entering Jefferson between 1966 and 1973. This group of female students was compared with a random sample of men matched with the year of entry, type of premedical program and ethnicity. Analysis of variance identified a difference between men and women only in the areas of professional attitudes. Twice as many female residents as male residents were rated in the top quarter on general effectiveness in dealing with people and nearly twice as many female residents were rated in the top quarter on being able to deal with patient and family tensions.

The accelerated premedical curriculum was examined to see whether or not there were deleterious effects resulting from a considerably shortened premedical education. The accelerated student group did not score as high as the control groups on general effectiveness in dealing with people or on the ability to handle patient/family tensions. The accelerated group did not rate in the top quarter on an item dealing with a sense of humor. Overall, the students entering medical school on an accelerated program showed no significant deficits in clinical effectiveness.

*Proceedings of the Eighteenth Annual Conference on Research in Medical Education,
Washington, DC, 1979; 425.*

BACCALAUREATE PREPARATION FOR MEDICAL SCHOOL: DOES TYPE OF DEGREE MAKE A DIFFERENCE?

Carter Zeleznik, Mohammadreza Hojat, J. Jon Veloski

Four groups of medical school matriculants (43 with a B.A. degree in social science, 68 with a B.A. degree in the humanities, 49 with a B.A. degree in science, and 40 with a B.S. degree in science) were studied. No significant difference was found among the four groups on yearly grade point averages in medical school or on Parts I, II, and III of the Examinations of the National Board of Medical Examiners. Those with an undergraduate degree in the humanities considered leaving medical school more frequently than the others. A substantial proportion of medical students with an undergraduate major in the sciences and social sciences reported they would choose the humanities if they were once again high school seniors. Those with a science background were disproportionately more likely than the others to choose residencies in internal medicine and surgery, and those with undergraduate degrees in the humanities and social sciences were more likely to choose psychiatry residencies.

Journal of Medical Education. 1983; 58:26-33.

**LEVELS OF RECOMMENDATION FOR STUDENTS AND ACADEMIC
PERFORMANCE IN MEDICAL SCHOOL**

Carter Zeleznik, Mohammadreza Hojat, J. Jon Veloski

Traditionally, letters of recommendation from undergraduate institutions have been considered a major criterion for admission to medical school. Little attention, however, has been directed to the relationship between the content of their recommendation and measures of performance in medical school. This study was designed to determine whether or not such a relationship exists.

Letters of recommendation for 236 students who came to Jefferson from five different undergraduate institutions were reviewed and the level of recommendation contained in each letter was identified. These were compared with the yearly GPA's, scores on three parts of the National Board Medical Examinations, and ratings of performance in the first year of residency training. Simple correlational, multiple regression, and factor analysis all indicated that the level of the recommendation did not contribute significantly to the ability to predict the medical student's academic performance.

Psychological Reports. 1983; 52(3):851-858.