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*Program in Medical Sciences

The Program in Medical Sciences (PIMS) is designed to combine the selection of a heterogeneous class without significant ABSTRACT change in the educational environment as designed for a homogeneous class. The program is an attempt to equalize the allocation of resources of the medical profession and to provide primary care physicians to underserved areas. The program is in use at Florida A and M and Florida State Universities in Tallahassee; it utilizes the Arts and Sciences faculty to furnish the basic medical sciences for a class of 35 students each year, who then complete their medical education at the University of Florida College of Medicine in Gainesville. The program is integrated with the undergraduate curriculum of the student so that the total time required from high school to M.D. degree may wary from six to nine years depending on the student. The admissions philosophy is designed to favor selection of students with a high propensity for primary care practice in underserved areas of health care and is based on demographic background, social and economic background, and personality type. A selection model based on this background data and traditional variables (GPA, MCAT, and faculty recommendation) is used to determine how well the admissions committee is meeting the philosophical goals of the program. Preliminary results of the longitudinal study underway indicate no significant difference in the performance of the PIMS students and University of Florida campus students on the basis of class rankings, clinical grades, or national test scores, and PIMS students are selecting primary care residencies. (JMF)

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THE SELECTION OF PRIMARY CARE PHYSICIANS

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> Workshop for Undergraduate Education in Family Medicine The American Academy of Family Physicians

> > Kansas City, Missouri May 12-14, 1975



INTRODUCTION

As early as 1970, the Carnegie Commission on Higher Education had addressed itself to the problem of insufficient physician manpower, defining this critical issue in terms of both net shortages and improper utilization of health care personnel. By 1974, medical educators had further redefined the problem to reflect, not so much a severe shortage in aggregate numbers of physicians as the maldistribution of physicians in terms of specialty choice and geographic location, the underrepresentation of minorities, and discrepancies in health care productivity (1). This unequal allocation of resources is now seen to be the result of the medical education process itself, which in large part continues to stress a centralized, technological, hospital dependent, acute care, disease oriented, specialty based type of medicine (2) that begins with premedical education and continues through medical selection, medical education and into professional practice. I recently wrote a paper on more general problems of admissions criteria which force students into an unfortunate mold which I labeled "Technician Specialoids" - with emphasis on the mechanical and mechanistic inferences of the word "specialoid". (3)

My charge this morning is to focus on the admissions process, but it is extremely important to point out that although admissions is a critical point in the education of a physician, the eventual specialty choice, geographic location, and type of practice are certainly more dependent upon the student's higher education experiences and the accompanying socialization within selected channels of premedical and medical education. We are talking about a process (admissions) which links the first twenty years of a person's life to the remaining forty or so years and is therefore a necessary, but certainly neither the sufficient nor the only determinant of the characteristics of that career. The admissions process is, however, the limiting entry point for that career, and therefore it is a focal point for change. Of one thing I am sure, the admissions process is more easily accred than the medical curriculum! Changes in the objectives and social responsiveness of medical



education are seen earlier in the admissions process than in any other aspect of an increasingly institutionalized and self protective segment of higher education.

GENERAL PROBLEMS OF MEDICAL ADMISSIONS

Let's look first at the general problems faced by admissions committees in 1975. The medical admissions committee of the mid 1970's finds itself in a very unusual position. For the past three decades that committee was charged with selecting a homogeneous group of students with similar high academic credentials from an already homogeneous applicant pool comprised predominantly of white, male, 21 year old, middle to upper class college graduates from a relatively small group of undergraduate schools, mostly elitist. The applicant pool was generally one and one-half to two times the number of places available.

The traditional response to an increasing pool of applicants at any time was to select an even more homogeneous class with still higher academic credentials. Yet, in 1975, with an applicant pool more than three times the number of entering places, the admissions committee is expected to respond in addition to a highly visible array of legal, moral, and social pressures to select a more heterogeneous class of medical students who, in addition to strong academic credentials, will be expected to solve the problems of vertical (specialty choice) and horizontal (geographic) maldistribution; who will reflect more accurately the population of currently underrepresented groups in the physician population (racial minorities, women, rural students - as examples); and who will be expected to fill a variety of new roles in a changing health care system involving physician extenders, team health care delivery, and the probability of National Health Insurance.

Such heterogeneity is difficult to attain by traditional methodologies of selection. Further, most aspects of the medical education system are not designed for heterogeneous groups of students with different cultural backgrounds, different academic backgrounds, and different responses to a fixed set of learning experiences.



This combination of selection of a heterogeneous class without significant change in the educational environment as designed for a homeogeneous class is certainly one of the current major problems in undergraduate medical education.

THE PROGRAM IN MEDICAL SCIENCES

What I was asked to present to you this morning is a brief description of a four year old program in medical education which is attempting to do just that: to select a heterogeneous group of students, including many with a high propensity for primary care practice in underserved areas; and to create an educational environment in the basic sciences which is supportive of that selection process.

The Program in Medical Sciences (PIMS) is an individualized program in medical education at Florida A and M and Florida State Universities in Tallahassee. This program utilizing primarily Arts and Sciences faculty, furnishes the basic medical sciences (except systemic pathology) for a class of thirty-five students each year who then complete their medical education (clinical clerkships and electives) at the University of Florida College of Medicine in Gainesville. The program is integrated with the undergraduate degree curriculum of the student, with medical courses taken over a one and one-half to three year period, depending on the track chosen. The total time required from high school to the M.D. degree may vary from six years to nine years, depending on many factors, including educational back, r and and professional goals of the individual student.

The primary thrust of the planning of this program was derived from an effort to create a unified educational environment with consistency for selection, curriculum, self-instruction, academic reinforcement, and financial aid. The objectives were as follows:

A. To furnish a time-flexible pathway (both accelerated and decelerated)
with early admissions, for the preclinical education of medical students;
all such pathways to incorporate a full baccalaureate degree in any major



or college at Florida State or Florida A and M.

- B. To create a selection process which would favor students who by background and attitude show a high propensity for primary care practice in underserved areas of health care.
- C. To develop a supportive educational environment which could match the students' needs and interests while assuring a level of preparation in the preclinical sciences equivalent to that received by the students passing through the admissions and basic science curriculum of the University of Florida.

In general, we consider the Program in Medical Sciences to be a bridge program from undergraduate to clinical education in which the bridge is lengthened or shortened according to the needs and perceptions of the individual student.

ADMISSIONS PHILOSOPHY

Let's move now to the PIMS admissions criteria as shown in the selection model which we developed to analyze the process of admissions and to form the foundation for our longitudinal study. The selection model is based on two partially tested assumptions:

- A. That certain factors taken in aggregate could predict a given student's propensity for primary care in underserved areas.
- B. That those same factors also predicted less likelihood of such students being admitted to medical school via traditional admissions criteria.

Those factors which are known to have some predictive relationship toward the delivery of primary care in underserved areas include:

A. Demographic Background: Among other studies and reviews, those of Anthony
Pollitt (4), Cullison, Reid and Colwill (5), and Oates and Feldman (6), all
show that the size and type of the student's hometown community are directly
related to eventual practice location and to type of specialty choice. In
these studies, it is reasonably clear that demographic background and specialty
choice are inter-related; not only does a rural or small town background



predict a propensity for primary specilty choice, but if a primary specialty is selected, the student has about a 65% probability of practicing in a demographic area similar to his or her background (5).

- B. <u>Social and Economic Background</u>: Anthony Pollitt in a recent study conducted for Human Science: Research Corporation (4), found that the social and economic status (SES) of the student's family appeared to be the single most important determinant of practice location. Students from upper-lower and lower-middle income groups, and students from families with relatively low social status are more likely to practice medicine in underserved areas and by correlation, more likely to select primary care specialties.
- Shown predictive relationships between certain personality types and specialty choice. For example, in the Myers-Briggs Type Indicator (MBTI), a Jungian based research instrument, four preference scales are used to derive sixteen possible combinations or "types". Those preference scales are:

extraversion - introversion (the direction of interest)

sensing - intuition (perception)

thinking - feeling (judgement)

judging - perception (life style)

Mrs. Myers has shown that "Sensing" types who are accepted to medical school

- a. are likely to have lower MCAT scores than their "Intuitive" type counterparts;
- b. but rank as high as Intuitives in the clinical education years;
- c. are more likely to select a primary care specialty;
- d. are more likely to practice in a smaller community;
- e. represent a smaller proportion of medical classes today than 20 years ago.



If we now look at just those three factors, demographic (small town/rural and possibly inner city), low SES, and "Sensing" Type, we have described a student with a high propensity for primary care in underserved areas, and we have described a student who is likely to have a less rigorous academic background from high school, score lower on standardized exams, be less sophisticated and hence, evidence fewer leadership experiences, and have a lower GPA - at least in the early years of college. That student is also less likely to view medicine as a career choice, less likely to enter college or medical school for financial reasons, and even if entering, is less likely to be encouraged, either externally or internally, to consider medicine as a career.

We should note that the references above relate to rural or small town practice.

These background factors may also predict a propensity for inner city practice as an underserved area, but that is not known at this time.

SELECTION MODEL

Given that background, a selection "model" was developed by Ms. Susan Braziel of the PIMS staff (now University of Michigan) utilizing the traditional variables plus these three non-traditional, primary-care-predictive variables.

Diagram 1 shows the ten factors used in the selection model. In Diagram 2, the maximum scores, and distribution of weights between academic and non-academic variables are indicated (roughly 50/50). Diagrams 3, 4 and 5, break down the model into three sets of variables:

Diagram 3 - Traditional variables (GPA, MCAT and faculty recommendations). Note that GPA is corrected for slope, and that the MCAT scores are doubly weighted in the quantitative and science sections - a slight safeguard in the selection of a heterogeneous class. The formula for Florida



High School placement score is generated as an equivalent to the MCAT, because many of our students are selected prior to their junior undergraduate year, and hence prior to taking the MCAT.

- Diagram 4 Interview variables, taken from the interviewers' reports, and designed to augment and quantify the weight given to such factors as leadership, work load, and personal attitudes.
- Diagram 5 Non-traditional variables: Demographic background, socioeconomic status, and personality type. These non-traditional variables can account for a maximum 150 points of 20% of the total maximum model score, sufficient to compensate for the statistically expected lower GPA and test scores for these non-traditional students.

Note that the model achieves a balancing effect. A student from a suburban, advantaged background is expected to perform at a higher academic level, and is rewarded for doing so, although that student is less likely to enter primary practice in an underserved area. The student from a non-traditional background (rural, inner city, low SES etc.) is expected to perform less well (at that time in his or her career) but the lower performance is related more to background than to actual ability. Since such background is also predictive of a higher propensity for primary care in underserved areas, the somewhat lower academic performance is compensated by adding points for those demographic, SES and personality factors described above.

I will comment again at a last point on the curriculum which rewards the advantaged student with the opportunity for acceleration, and rewards the non-traditional student with time to make up the academic deficiencies (not deficiencies in ability) resulting from his or her background.



FUNCTIONS OF SELECTION MODEL

The model is not currently used in the selection process for PIMS, except to determine how well the admissions committee is meeting the philosophical goals of the Program.

Diagram 6 indicates for the current class how well it predicts the behavior for the selection of 36 out of 76 prescreened students (N total = 103). Diagrams 7 and 8 show a breakout of the model variables for the selection of that same class. Note the heterogeneity represented in traditional academic variables (GPA 2.70 - 4.00 and MCAT scores of 335 to 765). Also note that the lower-middle and upper-lower SES levels account for 50% of the selected class. Actually, when the class was completed 67% of the students showed positive indicators for primary care on two variables and 35% were positive on all three variables.

Secondly, the model furnishes the basis for our longitudinal study of PIMS students, using two natural control groups: those students selected by the University of Florida College of Medicine (70% of the total class) who share with the PIMS students a common clinical and elective educational path; and those FSU and FAMU students who are not selected by PIMS but who are admitted to other medical schools.

Third, and finally, the model is designed to be converted into a multiple regression equation in which each of the whole number coefficients (shown here) will be converted to predictive validity coefficients on the basis of the longitudinal study. At that time, the model will be used directly by the selection committee.

It is important to point out that we gather significantly more data on each student than is used in this selection model, in the hopes of determining additional



shared characteristics of students entering primary specialty practice in underserved areas. For example, we also require testing on the Minnesota Multiphasic Personality Index (MMPI) and on the Alport-Vernon-Lindsey Study of Values (AVL); and we collect a great deal more data in the demographic, SES, and family history domains than are now utilized in this simple model.

OTHER FACTORS OF THE PLMS ADMISSIONS PROCESS

There are a few other important differences in our selection process which deserve to be mentioned, and which we believe have positive ramifications for the types of students selected.

- A. The committee is significantly different in composition than for most tractional medical schools. Based on the assumption that members of admissions committees tend to reproduce themselves, the members of cur committee were chosen in the hopes that they would indeed do just that. The committee is made up of:
 - 4 practicing physicians (primary specialties)
 - 2 medical students
 - 4 basic science faculty (chosen on the basis of excellence in teaching and advising)
 - 2 Student Affairs staff members
- 2 representatives of the University of Florida Admissions Committee

 The committee contains three Black members and four female members at present.
- B. Significant emphasis is placed on attitudinal factors, an area in which we have a great advantage, since all of our students come from only the two campuses in Tallahassee. We gather information from a large number of sources including faculty, advisors, secretaries, students, employers and



Student Affairs staff. These inputs are added to the traditional three interview reports.

C. The final selection of the class is a "forced decision" process in which
the committee must actually review the entire set of applicants and justify
each addition to the class in comparison to all other applicants.

A comment here is appropriate on the advantages of early selection. Students are admitted to "Secured" status (meaning they are guaranteed a position for clinical education at Gainesville assuming adequate academic and attitudinal development) as early as their sophomore year and usually no later than the end of their junior year. Students who are secured have the right to apply elsewhere knowing they are already admitted to medical school. If they are happy with PIMS and I'lorida as their choice of schools, they need not apply to any medical school. Students who are not secured are simply premedical students with the right to apply directly to the medical schools of their choice.

Early selection is not only humane, but has significant educational advantages for the student as well. Imagine being able to select the courses for half of your baccalaureate degree knowing that you have a place in medical school, rather than having to compete for that place - with the concernitant pressures that entails. Finally, students are secured for a first year medical school position in any year they are ready; reapplication for a different year of entry than expected is not required.

RESULTS OF SELECTION

The final outcomes of the selection process must be measured against two objectives:

A. How do the students perform in comparison to the students selected at the University of Florida campus? Our second class (13 students - class of



1976) recently completed their clinical clerkships. At this time there is no differentiation evident on the basis of class rankings, clinical grades, or national test scores. We have reason to believe that such comparable performance will continue, since our curriculum is constantly improving.

B. Do the PIMS-selected students select primary care specialties more frequently than their University of Florida selected counterparts? We have only our first class (5 students - class of 1975) to measure. Four of the five selected primary care residencies; two of those in family practice. We have about two more years (81 more students) to wait to get any real data on specialty choice, and then three or four years beyond that to be able to look at practice type and location via our longitudinal study.

ADDITIONAL COMMENTS

I should add to my comments on the time and content flexible curriculum which is essential as a companion to the selection process. About 20% of our students accelerate (6 or 7 years to the M.D. degree), about 65% assume the normal eight year curriculum and about 15% decelerate (9 years to the M.D. degree). Some aspects of importance in our curriculum include:

- A. Small course units: the curriculum is broken into 20 course units of instruction rather than the traditional six. Each unit (e.g. neurophysiology part of four physiology courses) is offered twice or three times yearly, allowing flexibility of scheduling, and repeatability (when necessary) within the same academic year.
- B. Gradual transition from a full undergraduate course load to a full medical course load.
- C. Extensive use of self-instructional and self-testing materials, including computer assisted instruction, television, audio-visuals etc. in a specially



designed medical sciences learning center. The objective is to have every curriculum module (lecture, lab, clinical correlation etc.) on a supportive and reiterative self-instructional format within the next few years.

- D. Student tutorial program: The use of repetitive course offerings allows us to hire our medical students as tutors, laboratory assistants and teaching assistants in courses where they have already shown proficiency, with obvious educational and financial aid advantages.
- E. Clinical correlations: To furnish career guidance motivational support and educational reinforcement for our students from an early point in their education. These include sophomore level seminars in clinical terminology and issues in health care, junior level experiences in health care delivery, and first medical year clinical seminars with practicing physicians and family practice residents.
- F. Clinical correlations are developed around primary disease problems such as obesity, drug and alcohol use, emphasema, diabetes, human reproduction and sexuality, upper respiratory infections, etc.
- G. In addition, we have developed or are developing a series of required and elective courses emphasizing basic sciences pertinent to preventive and primary care. These include clinical nutrition, human parasitology, genetic counseling, death and dying, computers in private practice, business aspects of small town solo practice, and sociobehavioral medicine (the role of the consumer and governments in health care).
- H. Where possible we emphasize interactions with other health care professionals. Many of our students are licensed emergency medical technicians. In the weekly diabetic clinic which we sponsor, the students work with social workers, nurse practitioners, nutritionists, and psychologists. A further example, the practical aspects of our course in physical examination is to a large extent taught by nurse practitioners.



CONCLUSION

You have now been introduced to an outline of one small attempt to alter the traditional criteria, methodology and rationale for medical admissions in search of students with a propensity for primary care in underserved areas.

As you all know better than I, the propensity seen at the admissions level is simply a raw statistic which is expressed differently in each individual student. Whether the propensity is translated into a reality depends upon you and your peers in undergraduate and postgraduate clinical education. Obviously I wish you all great success in that venture.



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PROGRAM IN MEDICAL SCIENCES

SELECTION MODEL

$$8(GPA)^2 + 4(MF)^2 + 3R^2 + 2S^2 + 3G^2 + M + 2D^2 + 2Q^2 + 3I^2 + A^2$$

DEFINITION OF VARIABLES:

GPA- Grade Point Average Formula

MF - MCAT Formula (High School Placement Test Equivalency Formula)

R - Faculty Recommendations

S - Socioeconomic Rating

G - Demographic Rating

M - Myers briggs Type Indicator Sensing Scale

D - Academic Distinctions

Q - Nonacademic Qualifications

I - Interviews

A - Discrepancy Evaluation (not in present use)

MAXIMUM VALUES

$$8(GPA)^{2} + 4(MF)^{2} + 3(R)^{2} + 2(S)^{2} + 3(G)^{2} + M + 2(D)^{2} + 2(Q)^{2} + 3(I)^{2}$$

 $8(4.0)^{2} + 4(5)^{2} + 3(5)^{2} + 2(5)^{2} + 3(5)^{2} + 25 + 2(5)^{2} + 2(5)^{2} + 3(5)^{2}$

Maximum Total Score - 628

Maximum Academic Score (GPA + MCAT + D) = 278 44%

GPA = 128

D = 50

Maximum Nonacademic Score (R + S + G + M + Q + I) = 350 56

R = 75

S = 50

G = 75

M = 25

Q = 50

I = 75

GRADE POINT AVERAGE

Maximum Value = $8(4.0)^2$

$$\left(\frac{\text{GPA}_{0} + \text{GPA}_{SC}}{2} + \Delta \text{gpa}}{3}\right)$$

GPA = Overall
GPA = Science

 Δ = GPA - last three quarters (average) MINUS GPA - preceding three quarters (average)

Maximum Value = $4(5)^2$

Florida High School Placement Test Equivalency Formula

Maximum Value =
$$4(5)^2$$

$$10^{-2} = 5.4(A + E + S) + 2(8.1 \times N_s) + 2(8.1 \times M_s) - 300$$

$$A = Aptitude$$

$$E = English$$

S = Social Studies

N = Natural Science

M = Mathematics

FACULTY RECOMMENDATIONS

Rated on a 1-5 scale by staff member in the Program in Medical Sciences Office. Average of 3+ recommendations from junior college and university faculty. (Note that .5 is subtracted from score for any recommendation missing. Minimum = 3)



INTERVIEW VARIABLES

ACADEMIC DISTINCTIONS

Maximum Value = 2(5)²

D

Rated by a 1-5 scale on the Interview Report during or immediately after student interview. Selection Committee members determine variables to be included in this category through information included in the Biographical Questionnaire as well as during interview, i.e.

large number of hours independent honors independent study difficult courseload honor societies rising GPA

NONACADEMIC QUALIFICATIONS

Maximum Value = 2(5)²

2

Rated by a 1-5 scale on the Interview Report during or immediately after student interview. Selection Committee members determine variables to be included in this category. Questions on the Biographical Questionnaire serve as indicators of extracurricular commitments - to be followed up by the interviewer, i.e.

large workload
family problems
extracurricular activities

INTERVIEWS

Maximum Value = 3(5)²

 $\frac{1}{3}$

Rated on a 1-5 scale during or immediately after interview. Variables to be included in this category are listed on the Interview Report, i.e.

integrity and maturity
personality
motivation
overall capability



NON-TRADITIONAL VARIABLES

DEMOGRAPHIC RATING

Maximum Value = 3(5)²

Taken from items on the Biographical Questionnaire.

Rural, small town, inner city - (9,999)	- 5
Large town - (49.999)	- 4
Small city - (99,999)	- 3
Smaller metropolitan area, suburb, or	_
large metropolitan area + MBTI Sensing	- 2
Smaller metropolitan area, suburb, or	_
large metropolitan area without MBTI	
Sensing	- 1

MYERS BRIGGS TYPE INDICATOR SENSING SCALE

Maximum Value = 25

Twenty-five points added to Model score for Sensing variable on the MBTI. If not Sensing, add one point.

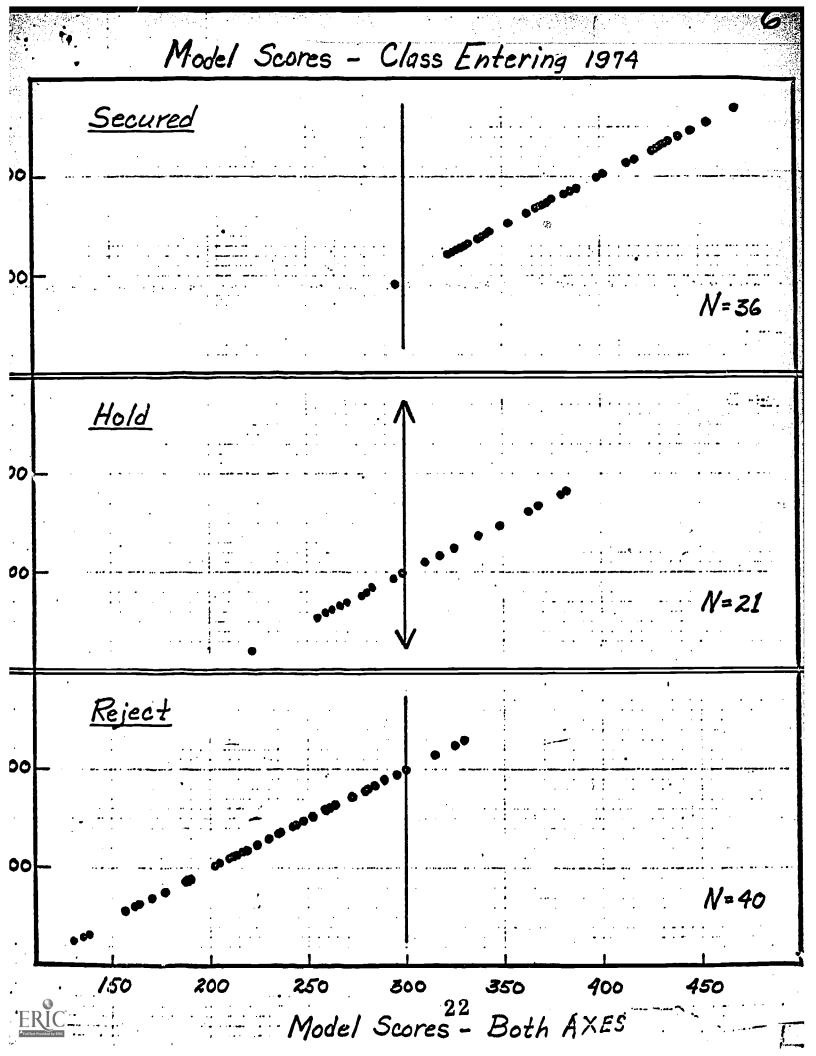
SOCIOECONOMIC RATING

Maximum Value = 2(5)²

Taken from McGuire-White, Index of Social Status - determined by weighted values for parent's occupation, source of income, and education.

Upper-lower/Lower-middle class - 5
Lower-lower/Upper-middle class - 4
Upper class - 3





CLASS ENTERING 1974

							
·	TOTAL	SECURED	ALTERNATES	HOLD	NON-PARTICIPANT		
	x	x	x	x	ž.		
GPA:		-		·			
Overall Range	3.08 1.85-4.00	3.42 2.70-4.00	3.30 2.66-3.82	3.11 2.66-3.66	2.84 1.85-3.56		
Science Range	2.97 1.54-4.00	3.41 2.77-4.00	3.31 2.56-3.82	3.04 2.67-3.50	2.64 1.54-3.63		
-MCAT							
Verbal Range	481 275-685	504 355-685	522 275 - 655	505 365-655	451 315-675		
Quantitative Range	540 375-715	583 445-715	541 405-685	520 455-665	516 375-615		
Genl. Info. Range	513 285-765	538 395-765	489 285 635	498 405-625	504 385-625		
Science Range	520 335-725	551 335-725	536 455 - 645	525 395-655	491 405-605		
Total Range	513 378-710	544 425-710	522 378-638	512 430-632	491 418-585		
HSPT	388	426	. 311	366	, 37		

								·.		· .*
<i>i</i>	TOTAL		AL SECURED ALTERNATE		TERNATES	HOLD		NON-PARTICIPANT		
	#	ક	#	ક	#	8	#	8	#	8
TOTAL:	103	100%	31	27%	9	9%	9	9%	54	5 ,5%
Black White	14 89	14% 86%	5 2 6	16% 84%	.2 7	22% 78%	2 7	22% 28%	6 48	11% 89%
Female Male	23 80	22% 78%	8 23	26% 74%	3 6	33% 67%	2 7	22% 78%	10 44	19% 81%
Florida A & M Florida State	11 92	- 11% 89%	4 27	7.3% 87%	2 7	22% 78%	1 8	11% 89%	4 50	77% 93%
Biology Chemistry Psychology Other	67 8 5	71% 9% 5% 15%	19 4 ,2 5	63% 13% 7% 17%	5 1 2	56% 11% 33%	5 1 2	62.5% 12.5% 25%	39 2 3 4	81% 4% 5% 8%
Upper Upper-Middle Lower-Middle Upper-Lower Lower-Lower	14 47 21 12 1	15% 49% 22% 13%	6 10 8 6	20% 33% 27% 20%	2 3 3 1	22% 33% 33% 11%	1 2 2 1 1	14% 29% 29% 14% 14%	5 32 8 4	10% 65% 16% 8%
Rural (9,999) Large Town (49,000) Small City (99,999) Metropolitan (over 100,000)	12 22% .18 46	12% 22% 18% 47%	4 6 7 14	13% 19% 23% 45%	4 2 2	44% 22% 22% 11%	1 6 1	12.5% 75% 12.5%	3 8 8 31	6% 16% 16% 62%
Sensing Non-sensing	27 42	39% ~ 61%	7 14	33 % 67%	8	100%	3 2	60% 40%	17 18	49:, 51%
	E .	,	5	1	4	1	Ĭ.		•	3

