

MEDICAL EDUCATION

Factors Relating to Academic Performance of Medical Students at the University of British Columbia

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DURING the past decade a great deal of attention has been directed by medical schools to the improvement of their appraisal of student applications.¹ Nevertheless, although studies have ranged in complexity from simple chi-square methods of analysis to highly sophisticated factor analysis,² they have usually demonstrated a low correlation between pre-medical achievement and subsequent medical school performance.

This should not be surprising since two prerequisite assumptions are quite likely false: that pre-medical achievement is unrelated to acceptance into first-year medicine, and that academic performance is assessed according to certain absolute criteria which do not vary from year to year. In contradiction to the first assumption, pre-medical achievement is given the greatest weight by medical school screening committees;^{3, 4} the resulting high correlation between pre-medical grades and medical school acceptance, therefore, restricts the range for measurement of any correlation between academic achievement before and after entry into medical school. It is almost certain that the second assumption is also false: students are likely graded in relation to other students in their own class rather than according to some absolute scale of excellence which does not vary from year to year.

It is also not clear whether academic performance bears any relationship to those qualities which eventually distinguish the good practitioner of medicine. Indeed those very qualities have evaded precise definition, though they are being clarified.⁵ Even if they were generally agreed upon, the multiplicity of possible career choices open to the student would still make it necessary for the schools to expect general academic competency during the years of medical training. It is certain that the student cannot graduate to become a doctor unless he can get over the academic hurdles.

This report is a review of factors observed to be related to the academic performance of students in the medical school of the University of British Columbia. Some of the observations corroborate or extend the findings of studies at other Canadian medical schools.^{6, 7}

ABSTRACT

The performance of medical students enrolled at the University of British Columbia from 1952 to 1961 is reviewed and related to certain descriptive factors available to the screening committee at the time of application. Almost 40% of enrolled students had academic difficulty in medical school; 16.4% failed a complete year. Since 91% of students who failed out, did so after freshman medicine examinations, these grades were examined for significant association with certain intellectual and non-intellectual factors. Sex and year of registration were not significantly associated with freshman performance, but permanent home address was: students from other Commonwealth countries did not perform as well as Canadians. Significant correlations were observed between both pre-medical grades and Medical College Admission Test scores and first-year medicine marks. By multiple regression analysis four factors were found to be predictive: age, number of pre-medical years completed at the time of application, overall pre-medical grade average and "Science" M.C.A.T. score. From the resulting equation, 77.4% of the grades of medical students who completed their freshman year in 1962 were predicted within one standard error. Students on the whole were noted to perform consistently in pre-medicine and medicine.

MATERIAL AND METHODS

The data were collected during a study of applicants for admission to the medical school at the University of British Columbia during the period 1952 to 1961. This decade of experience has been previously published.⁸

Three years of pre-medical training after Grade 12 must be completed before a student can enrol as a medical freshman at this school. Prerequisite subjects at the present are: first-year college English and mathematics, elementary college physics, general zoology, and three years of college chemistry including analytic and organic chemistry. Virtually all applicants take the Medical College Admission

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Test (M.C.A.T.) now prepared by the Psychological Corporation of New York. This test is in four sections: "Verbal Ability", "Quantitative Ability", "Understanding Modern Society"* and "Science". The screening committee accepts only 60 students from the eligible applicants, apparently according to their undergraduate academic achievement and all M.C.A.T. scores except "Understanding Modern Society".⁸

The training program lasts four years and leads to the M.D. degree after the student successfully passes conjoint examinations of the Medical Council of Canada and submits an acceptable thesis. The student's undergraduate advancement is affected by the following standards and practices:

1. The passing mark for each course is 60%.
 2. If the progress of a student has been unsatisfactory in any given session, he may be permitted to write a supplemental examination in the subject(s) failed. This privilege is not usually granted if he has failed more than two subjects, or has an overall average of less than 60% in the work of the year including the failed subjects. The passing mark on a supplemental examination is 65%.
 3. A student in first year who fails to be promoted is not permitted to repeat the year except under special circumstances.
 4. A student is not permitted to repeat more than one year except under special circumstances.
- Medical school grades are customarily grouped into four categories of performance: first class (80% or more), second class (65% - <80%), pass (60% - <65%) and failure (less than 60%).

During the decade of 1952 to 1961, 589 students entered the medical school; their fate at the time of the study is indicated in Table I. Disregarding those students enrolled in first-year medicine during the term 1961-62 and those students who withdrew before writing freshman final examinations, there were 503 students whose first-year academic record could be assessed when the data were compiled in January 1962. An additional ten students transferred from other schools after the freshman year.

Application forms and medical school records for all enrolled students were reviewed and certain data were coded and punched on IBM 80-column data cards. These cards were then sorted and analyzed on the University of B.C. IBM 1620 computer. Appropriate statistical tests were used: chi-square tests were used to assess the association between certain qualitative variables, and single-order correlations were developed for quantitative variables. In addition, a computer program of multiple regression analysis was used to assess the relative importance of certain variables in the prediction of freshman medical grades. In the various statistical tests, a probability of $P \leq .05$ was accepted as significant.

TABLE I.—FATE OF ENROLLED MEDICAL STUDENTS, UNIVERSITY OF BRITISH COLUMBIA, 1952-1961

	Number	%
Failed out.....	52	8.8
In training*.....	210	35.7
Graduated.....	296	50.3
Withdrew.....	28	4.7
Deceased.....	3	0.5
Total.....	589	100.0

*As at January 1, 1962.

OBSERVATIONS

1. Factors Relating to the Fate and Progress of Enrolled Students

The ultimate academic fate of all 589 medical students enrolled at the University of British Columbia from 1952 to 1961 is presented in Table I. Fourteen per cent of this group has already left medical school because of failure, withdrawal or death. This fate, however, was not significantly associated with permanent home address,* place of pre-medical training* or a past history of pre-medical supplemental examinations subsequently passed. There was, however, a significant association between fate and prior failure in a pre-medical course; this is presented in Table II. The attrition by failure or withdrawal was almost twice as great for students who had a prior failure (22.8%) as for those who did not (11.9%). Since the screening committee usually rejected applicants with a history of failures in the prerequisite and science subjects, it seems likely that this association is really with a history of a failure in a non-science subject.

TABLE II.—ASSOCIATION BETWEEN A HISTORY OF A PRE-MEDICAL SUBJECT FAILURE AND THE FATE OF ENROLLED MEDICAL STUDENTS, UNIVERSITY OF BRITISH COLUMBIA, 1952-1961

Fate	Subject failures		
	None	One or more	Total
Failed out.....	37	15	52
In training.....	193	17	210
Graduated.....	253	43	296
Withdrew.....	25	3	28
Deceased.....	2	1	3
Total.....	510	79	589

$\chi^2 = 16.371$ ($P = .001$).

By definition the progress of medical students can only be determined after they have written freshman medicine examinations. The progress of all 503 students who wrote these examinations at the University of British Columbia plus 10 additional students who transferred into later classes is presented in Table III. Almost 40% of students had academic difficulties and 16.4% failed a complete year. This high proportion of students who get into difficulty is similar to that observed at

*Now called "General Information".

*These variables have been defined in a previous report.⁸

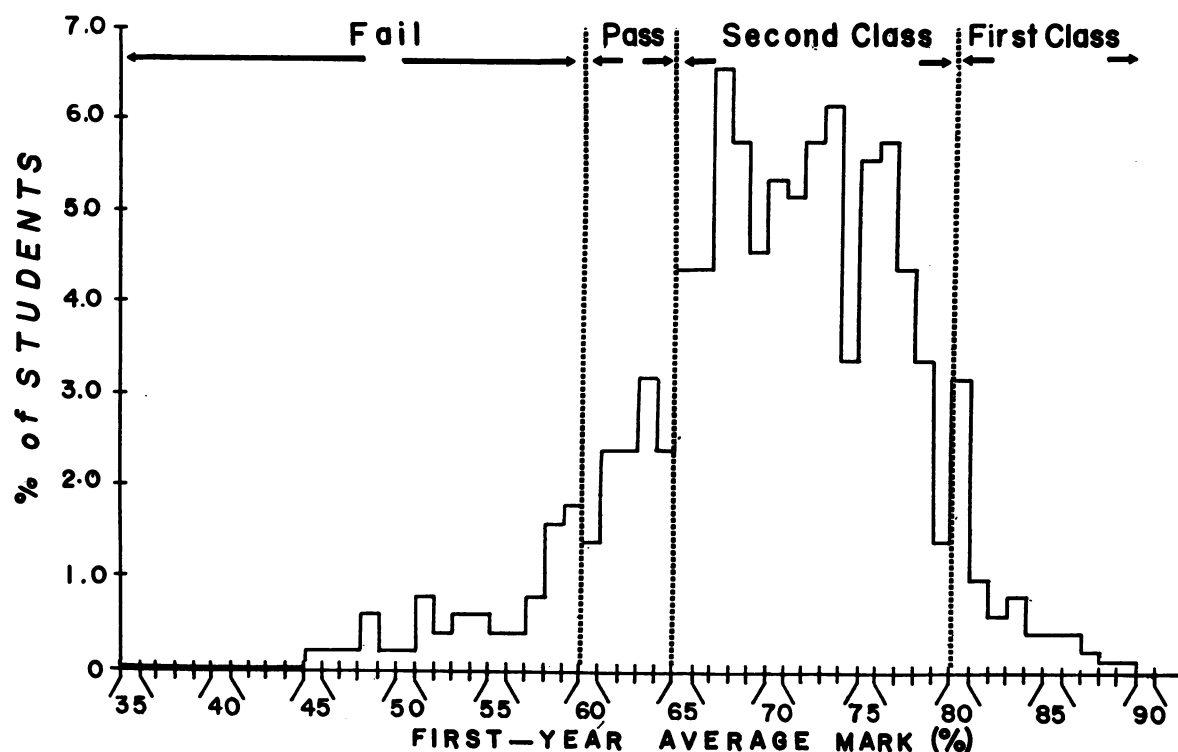


Fig. 1.—Histogram of distribution of average mark received by 503 first-year medical students at the University of British Columbia, 1952 to 1961. "Class" standing is also indicated.

certain other schools^{10, 11} but may be a direct result of promotional policies and academic standards at the University of British Columbia. The supplemental examination, which is regarded as an additional learning experience, is usually written after additional work has been done by the student under the direction of the department concerned. Of 198 students who had to write supplementals during 1952 to 1961, 114 passed the supplementals above the required minimum mark of 65%.

TABLE III.—PROGRESS OF MEDICAL STUDENTS,*
UNIVERSITY OF BRITISH COLUMBIA, 1952 - 1961

	Number	%
Acceptable.....	315	61.4
Supplementals passed.....	114	22.2
Failed one year.....	58	11.3
Failed one year, and required to write supplementals another year.....	26	5.1
Totals.....	513	100.0

*All who had written at least freshman medicine examinations by January 1, 1962.

2. Factors Relating to Performance on First-year Medicine Examinations

The earliest point in a medical student's career when his ability and achievement can be critically assessed is when he writes freshman examinations. This milestone is important in terms of his subsequent fate: 91% of students who failed out of medical school at the University of British Columbia did so at the end of first year. In terms of eventual graduation, then, if a student can get over the academic hurdle of freshman medicine, he is almost certain to graduate.

The distribution of the actual freshman grades* of all 503 students is diagrammed in Fig. 1; these marks appear to be skewed to the left. This impression is substantiated by the cumulative distribution of Fig. 2 which has been plotted on

*Not including supplemental examination results.

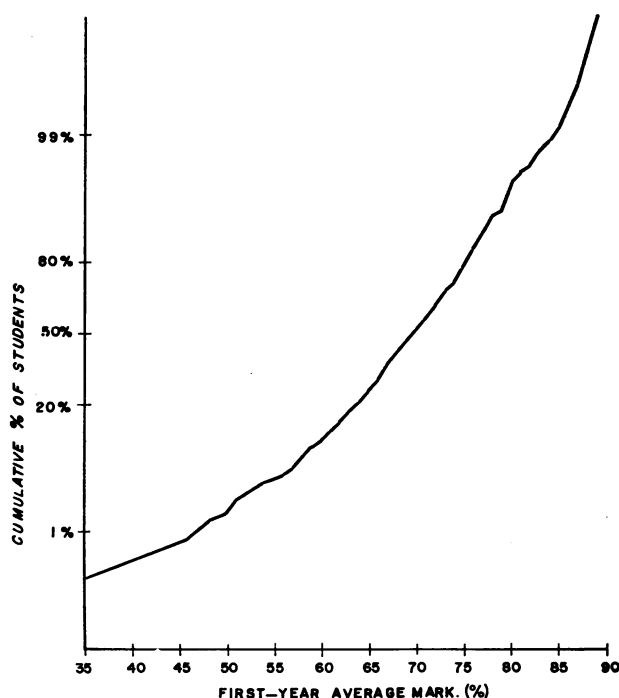


Fig. 2.—Cumulative distribution of average mark received by 503 first-year medical students at the University of British Columbia, 1952 to 1961, plotted on arithmetic probability scales. A normal curve would appear as a straight line.

TABLE IV.—ASSOCIATION BETWEEN FIRST-YEAR MEDICINE PERFORMANCE AND SEX, UNIVERSITY OF BRITISH COLUMBIA, 1952 - 1961

First-year performance*	Male		Female		Total	
	No.	%	No.	%	No.	%
Failure.....	43	9.4	3	6.5	46	9.2
Pass.....	54	11.8	5	10.9	59	11.7
Second class.....	329	72.0	33	71.7	362	72.0
First class.....	31	6.8	5	10.9	36	7.1
Totals.....	457	100.0	46	100.0	503	100.0

 $\chi^2 = 0.718$ (not significant).

*Before supplemental examinations.

arithmetic-probability paper. The resulting graph should be a straight line if the data were normally distributed. The upward concavity of Fig. 2 verifies the skewness to the left. Since the cumulative distribution above 60% is almost linear, the data would be normally distributed were it not for the unexpected proportion of failures.

It was originally planned to analyze the data for each sex separately, since it had been a cherished tradition that female students performed better than male students. Examination of Table IV fails to demonstrate female academic superiority. It was

It appears that Commonwealth students have a "high risk" of academic difficulties. Problems in adjustment to language and customs may be important reasons, but this risk may also be related in some way to student selection: only students who cannot gain admission to their local medical school or one in the United Kingdom may apply to Canadian schools. Certainly the excellent performance of American students is almost certainly the consequence of screening committee policy which admits only the better qualified American applicant.

Marital status has been related to medical school performance.¹² There were, however, insufficient medical students married at the time of first application to observe this effect.

3. Factors Correlated with First-year Grades of Medical Students

The association between quantitative variables is best expressed by a measure of the strength of that relationship such as the correlation coefficient* (also called the Pearsonian product moment and symbolized by r).

TABLE V.—ASSOCIATION BETWEEN FIRST-YEAR MEDICINE PERFORMANCE AND PERMANENT HOME ADDRESS, UNIVERSITY OF BRITISH COLUMBIA, 1952 - 1961

First-year performance*	Permanent home address					Totals
	Vancouver	Other B.C.	Other Canada	Other Commonwealth	U.S.A.	
Failure.....	7.9	6.1	11.1	29.5	0.0	No. 46
Pass.....	12.0	13.5	11.1	9.1	0.0	59
Second class.....	72.7	74.3	66.7	56.8	88.2	362
First class.....	7.5	6.1	11.1	4.5	11.8	36
Totals %.....	100.0	100.0	100.0	100.0	100.0	503
Number.....	267	148	27	44	17	

 χ^2 (calculated from the actual numbers in each cell) = 25.285 ($P < .05$).

*Before supplemental examinations.

also observed by chi-square analysis that there was not a significant association between freshman performance and year of registration ($\chi^2 = 9.77$, $df = 27$, not significant). This too contradicted strong impressions that certain classes were academically superior to others. If indeed classes do vary in quality, then this lack of association verifies the impression that a student's grade indicates only his performance relative to that of his classmates. In subsequent analyses, therefore, detailed breakdowns by sex and year of registration were not performed.

Permanent home address was found to be significantly associated with performance in freshman medicine (Table V). Eighty per cent of British Columbian students and 77% of other Canadian students achieved second-class standing or better on these examinations. This record was matched by only 61.3% of students from other Commonwealth countries (44 students) who in this school equal half of the non-British Columbian contingent. About 30% of these Commonwealth students failed a course and had to write a supplemental.

Table VI is a list in descending order of the correlation coefficients of various pre-medical grades and scores to overall grades subsequently obtained in first-year medicine. Correlation coefficients have been calculated for all students who had taken the pre-medical examination in question before they had applied for entry to the medical school. Since students generally first apply to the school before they have written final examinations in organic chemistry, this correlation coefficient was based upon a small sample. Only grades obtained at the University of British Columbia have been used to calculate these correlations in order to obviate the necessity of equating grades from many institutions.

All the correlation coefficients listed in Table VI were significantly greater than zero, the value expected for r if there was no correlation, when tested by Fisher's zeta function.¹³ The overall pre-medical

*It is necessary that two sets of quantitative data being correlated be each normally distributed. It has been shown in Fig. 2 that first-year marks are unfortunately skewed to the left. While theoretically scale transformations should have been carried out, it was our opinion that the increase in the precision of r which would result was not sufficient to justify the labour.

TABLE VI.—CERTAIN CORRELATIONS WITH FIRST-YEAR MEDICINE GRADE,† UNIVERSITY OF BRITISH COLUMBIA, 1952 - 1961

	Sample size	Correlation coefficient
	(n)	(r)
Overall pre-medical average*.....	469	+ .43
Zoology 105 (General Zoology)*.....	384	+ .39
Prerequisite average*.....	467	+ .38
M.C.A.T.—“Science”.....	475	+ .34
Physics 101 (General Physics)*.....	394	+ .29
Chemistry 200		
(Analytic and Physical)*.....	407	+ .28
Chemistry 101 (General Chemistry)*..	420	+ .27
Chemistry 300 (Organic Chemistry)*..	111	+ .26
Mathematics 101		
(Algebra, Trigonometry)*.....	428	+ .21
M.C.A.T.—“Verbal Ability”.....	475	+ .21
M.C.A.T.—“Quantitative Ability”...	475	+ .20
English 100 (First-year college English)*.....	405	+ .19
M.C.A.T.—“Understanding Modern Society”.....	475	+ .15

†Before supplemental examinations.

*Calculated only for students who had taken these at the University of British Columbia.

Course number pertains to the University of British Columbia.

average was found to have the highest correlation ($r = +.43$) though it explained by itself only 18.5% of the total variance of the freshman medical grade. General zoology was the prerequisite subject most highly correlated with subsequent grade ($r = +.39$).

4. The Prediction of First-year Grades of Medical Students

Unfortunately, intercorrelations confuse the picture. For example, the prerequisite average was correlated with first-year medicine grade ($r = +.38$) because it was also highly correlated with the overall pre-medical average ($r = +.92$) which is itself correlated with the first-year medicine grade ($r = +.43$). These intercorrelations, however, can be resolved by the technique of multiple regression analysis.

Eight quantitative variables were collected for this analysis. The scores or grades used were those actually available to the screening committee at the time of application, and did not include grades subsequently obtained after the application was made. These variables were:

1. Age, expressed according to the following interval scale:

Less than 21 years ...	1	29 - 32	4
21 - 24	2	33 - 36	5
25 - 28	3	More than 36	6

2. Number of pre-medical years after Grade 12, expressed as follows:

2 years	1	Postgraduate 1 year ..	4
3 years	2	Postgraduate 2 years ..	5
4 years	3	Master's degree	6
		Doctoral degree	7

3. Overall pre-medical grade average, in per cent.

4. Prerequisite pre-medical grade average, in per cent.

5. M.C.A.T.—“Verbal Ability” score.

6. M.C.A.T.—“Quantitative Ability” score.

7. M.C.A.T.—“Understanding Modern Society” score.

8. M.C.A.T.—“Science” score.

These eight variables were available for 449 freshman medical students who had taken at least part of their training at the University of British Columbia. In order to calculate the overall and prerequisite pre-medical grade average for those courses which these students had taken elsewhere, the following percentages were arbitrarily assigned to letter grades: A = 85%, B = 75%, C+ = 63%, C = 61%, C- = 59%, D = 53%.

The IBM 1620 computer was then programmed to calculate the correlation matrix between these eight variables and the freshman grade, and to develop the appropriate multiple regression equation, residual variance and multiple coefficient of correlation R. The computer was then programmed to reject the variable which contributed least to R and to recalculate the equation; it continued this process until the variables were exhausted.

The multiple coefficient of correlation for all eight variables to freshman mark was $R = +.497$; after the prerequisite grade average and the “Modern Society”, “Quantitative” and “Verbal” M.C.A.T. scores were eliminated, R was still +.489. There was, however, a significant decrease in the explanation of variance when any of the following four variables were omitted:

Age at time of application (x_1),

Number of pre-medical years completed at the time of application (x_2),

Overall pre-medical grade average, in per cent (x_3),

M.C.A.T.—“Science” score (x_4).

The relationship of these variables to the first-year medicine grade (y) expressed in per cent was as follows:

$$y = 34.795 - 1.343 x_1 + 1.602 x_2 + 0.366 x_3 + 0.015 x_4$$

The standard error of prediction was ± 6.313 .

The relationship of freshman academic performance to age was noted to be negative at the University of British Columbia; this was also the experience at McGill University.⁷ In general, the younger the student and the longer his pre-medical training at the time of application and the higher his overall pre-medical grade and his “Science” M.C.A.T. score, then the higher the grade he would be predicted to obtain in first-year medicine.

This regression equation was used to predict the grades of 53 freshman medical students who entered the University of British Columbia in September 1961 and wrote final examinations in May 1962. It was noted that 77.4% of the observed grades were within one standard error of the prediction; this is better than expected by chance.

5. Consistency of Academic Performance

Do students perform consistently in both pre-medicine and medicine; that is, is there greater concordance between their performance in these

TABLE VII.—SUMMARY OF OBSERVED AND EXPECTED NUMBER OF STUDENTS WHO RECEIVE THE IDENTICAL "CLASS" AVERAGE IN FIRST-YEAR MEDICINE WHICH THEY ALSO RECEIVED ON OVERALL PRE-MEDICAL SUBJECTS OR PREREQUISITE SUBJECTS, UNIVERSITY OF BRITISH COLUMBIA, 1952 - 1961

"Class" mark %	Agreement with overall pre-medical average		Agreement with prerequisite subject average	
	Observed	Expected	Observed	Expected
<60	2	1.05	4	1.49
60 - 64	7	5.61	6	6.01
65 - 79	251	245.03	237	233.74
80+	15	4.91	17	5.28
Totals	275	256.60	264	246.52
χ^2	7.92		6.69	
Probability	.01 > P > .001		.01 > P > .001	

two programs than expected by chance? This question was analyzed by the chi-square method of Chen *et al.*¹⁴ in which the observed number of students who perform at the same level in both pre-medicine and freshman medicine is compared to the number expected from the marginal totals. This procedure is said to be statistically powerful in instances where the anticipated departure from independence is one in which there will be an excess in the same group. From Table VII it will be seen that there was a highly significantly greater number of students who obtained the same "class" mark than expected by chance for both the overall pre-medical grades and the prerequisite grades

TABLE VIII.—ASSOCIATION BETWEEN FIRST-YEAR MEDICINE PERFORMANCE AND AVERAGE PRE-MEDICAL PERFORMANCE, UNIVERSITY OF BRITISH COLUMBIA, 1952 - 1961

First-year medical performance	Average pre-medical performance			Totals
	50-64%	65-79%	80+%	
	%	%	%	No.
<60%	23.7	7.1	4.2	41
60 - 64%	15.3	13.6	1.4	56
65 - 79%	61.0	74.3	73.6	340
80+ %	0.0	5.0	20.8	32
Totals %	100.0	100.0	100.0	
Number	59	338	72	469

χ^2 (calculated from the actual numbers in each cell) = 49.067 (d.f. = 5, P < .001).

It is encouraging, however, to note (Table VIII) that 61% of those students whose pre-medical performance was only a pass standing* were able to improve their grades in medical school and completed their freshman medical year with second-class standing. It is also noteworthy that only 20.8% of students who entered medical school with first-class standing were able to retain that standing in freshman medicine.

DISCUSSION

The decade of experience with students in the Faculty of Medicine of the University of British

Columbia emphasizes and strengthens the hypothesis that the most important factor which pre-determines medical school performance is prior academic achievement. While much of the evidence has been collected from the study of freshman performance, this has a certain validity as a measure of eventual graduation, since 91% of all medical students who failed out of school did so at the end of their first year. In summary, observations at the University of British Columbia have shown a greater concordance between pre-medical performance and subsequent first-year performance than predicted (Table VII), and a significant correlation between freshman grades and grades obtained on any or all prerequisite subjects and on the overall pre-medical average.

This may merely mean that academic performance in the freshman medical year is the result of the continuation of study habits learned in the undergraduate years which are perfectly adequate for the learning of basic sciences. As the students progress in their training, these habits are less applicable and the distribution of marks obtained by each class narrows.^{10, 12} At graduation students cluster at a uniform "second-class" standing.¹⁰ These changes in standing which occur between the preclinical and clinical years are at present under study at the University of British Columbia.

Evidence was also obtained which suggests that ability, as distinct from performance, may be involved also. The "Science" section of the Medical College Admission Test involves a broad knowledge and understanding of concepts and problems, taken from basic college courses in biology, chemistry and physics. It is written, on the average, some two years after these subjects have been taken, though continuation of undergraduate studies in these fields should keep the basic concepts and subject matter in the applicant's mind. This score represents, however, something more than what is measured by pre-medical performance: though M.C.A.T. "Science" scores were found to be correlated to the overall pre-medical grade average ($r = +.38$) and prerequisite grade average ($r = +.44$), these correlations explain only 14.8% and 19.0% respectively of the total variance of "Science" M.C.A.T. scores.

Further evidence that pre-medical performance is not a measure of ability is contained in Table VII. Of 59 students who entered medicine with only "pass" standing (50-64%), 61% were able to improve their performance to "second-class" standing (65-79%) in first-year medicine. Unmeasured factors of motivation are probably operating here.

The predictive multiple regression equation which was developed stressed the importance of age and length of pre-medical training in relation to first-year mark. These two factors operate in contrary directions: the younger student who has completed a longer training program before applying performs better in first-year medicine. These contrasting influences could measure ability, motiv-

*In the Faculty of Arts and Science, grades of 50-64% constitute pass standing.

ation or perseverance, all of which usually lead the non-intellectual qualities considered to be important prerequisites for medical training.

The superior performance of the more youthful students has been described before;^{7, 15} the correlation to length of pre-medical training has not been the general experience.^{7, 10, 16} The student who extended his training beyond the required three years of pre-medicine, that is, who has "joined the community of scholars", performed better at the University of British Columbia.

TABLE IX.—SIGNIFICANT VARIABLES, MULTIPLE CORRELATION COEFFICIENTS, STANDARD ERROR OF PREDICTION AND "SUCCESS" OF PREDICTION EQUATIONS

Significant variables†	University of Saskatchewan (n = 99)	University of British Columbia (n = 449)
High-school average.....	—	*
High-school physics, chemistry and biology average.....	+	*
Undergraduate college average.....	+	+
M.C.A.T. "Quantitative" score.....	+	+
M.C.A.T. "Science" score...	+	+
Age.....		+
Number of pre-medical years		+
Multiple correlation coefficient.....	+ .59	+ .49
Standard error of prediction (SE).....	±7.00	±6.31
Proportion of first-year marks falling within +1 SE of predicted.....	81%	77.4%

†Direction of the effect given by the sign (+ or —).

*Not examined.

These factors were combined in a mathematical model to predict freshman medicine performance. Badgley, Hetherington and Macleod¹⁰ developed a similar multiple regression prediction equation for freshman medical students at the University of Saskatchewan. Of 15 variables they found that only five significantly contributed to the reduction of variance of freshman grades. A comparison between the U.B.C. and Saskatchewan models is presented in Table IX; the general similarity of significant variables and the success of prediction is to be noted. Two tradition-shattering conclusions emerge from these models: the prerequisite course average is not as valuable a predictor as the overall pre-medical course average (or, even earlier, the high-school performance) and the "Science" M.C.A.T. score is an important predictor even in the Canadian setting.

Nevertheless, the U.B.C. model explains only about 24% of the variance of its freshman medicine grades and the Saskatchewan model only about 33% of its freshman grades. It appears that rather intangible qualitative factors, the "non-intellectual characteristics", also determine how medical students perform. Socioeconomic data were limited in the University of British Columbia study, but it was noted that permanent home address significantly influenced freshman medicine performance:

students who came from Commonwealth countries did not perform as well as those from Canada or the United States. A similar effect of address was noted by Badgley, Hetherington and Macleod,⁶ who also studied other socio-economic factors in more detail.

It is clear that non-intellectual factors are important in predicting the academic, and possibly also the professional, success of prospective medical students. Nevertheless, though these factors are virtually ignored by screening committees, medical schools do remarkably well in selecting applicants who eventually become graduates. Indeed, "cut-off scores" can be developed for the use of the screening committee⁴ which can screen out with reasonable accuracy those students who are most likely to fail or withdraw. It appears that scholarship remains the basic foundation which, if inadequate, cannot support the weight of medical training. The non-academic factors are, of course, given certain consideration by personal interviews and letters of recommendation, but it appears clear that the objectives of these practices are so infrequently specified that their validity is completely in doubt.¹⁷ This is an important area for imaginative thought and constructive research by medical schools.

Until more of the non-intellectual factors are quantitated and analyzed, medical school screening committees must concentrate on scholarship. If students with adequate scholarship records fail, and they will, then it must be interpreted that motivation for learning was insufficiently developed. The onus falls back upon the faculty of medicine itself to review its teaching program in accord with current practices in the field of medical education.¹⁸ This is the great challenge which faces most Canadian medical schools.

SUMMARY

The performance of medical students at the University of British Columbia from 1952 to 1961 has been examined in relation to certain intellectual and non-intellectual characteristics. Previous academic performance in undergraduate pre-medical courses and the score obtained on the "Science" section of the Medical College Admission Test emerged as most predictive of subsequent performance. Youthfulness and lengthy pre-medical training were also important factors. Students who came from other Commonwealth countries did not perform well.

Many of these factors were expressed in terms of a mathematical model which predicted within limits the freshman marks of more than 77% of the first-year students who enrolled in 1961.

Though students were more likely to perform at the same level of achievement in both pre-medicine and medicine, the majority of students who entered with the lowest academic qualifications actually improved in medical school, and those with the highest qualifications actually fell to lower levels of performance.

The importance of non-intellectual factors was deduced from the analysis of these observations, though the medical school appears to be singularly successful in graduating all but 14% of its students without

apparently considering anything but intellectual factors in its selection process.

These factors are discussed, and it is concluded that this failure-withdrawal rate may be reduced by directing further attention to teaching and learning experiences in medical school.

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GENERAL PRACTICE

Current Concepts in Dermatology:

Part III. The Use of Radiotherapy and Corticosteroids

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RADIOTHERAPY

AT THE Twelfth International Congress of Dermatology held in Washington, D.C., in September 1962, a whole day was devoted to radiobiology and dermatologic radiation therapy. It was noticeable that all over the world ionizing radiation was being used less and less for the treatment of diseases of the skin. Many fairly common conditions can now be managed quite satisfactorily by other means. Tinea capitis infections in humans can be cured by oral griseofulvin; severe cystic pyogenic acne responds well to long-term low-dose tetracycline therapy; localized chronic eczema usually responds very well to treatment with topical steroids and occlusion (see later); ordinary cavernous hemangiomas resolve spontaneously in almost all cases; warts in children disappear with almost any therapy; and many small localized skin cancers are as well treated by excision or electrodesiccation and curettage as by radiation. Of course, problem cases exist among the aforementioned conditions in which it may be decided that radiotherapy is the treatment of choice. However, such patients are certainly in the minority, and where radiotherapy was used routinely it is now used only occasionally.

ABSTRACT

The use of ionizing radiation and corticosteroids is discussed, in this third and final part of a review of diseases of the skin. Radiation is being used less extensively because superior methods of treatment are available for many conditions which formerly were frequently treated by this modality. The concept of applying the radiation at the level of the basic pathologic process has been developed into clinical practice by the use of generators which can produce very soft (or superficial) ionizing radiation. Topical or systemic corticosteroids do not cure skin diseases but produce dramatic suppression of signs and symptoms. For best results consideration must be given to the diagnosis, the natural history of the disease to be treated, the method of administration and a search for possible contraindications to the use of these steroids. Basic dermatological principles (removal of offending agents, bland soothing applications, sedation, etc.) must be adhered to. The corticosteroids are not a panacea in the treatment of skin disease.

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