GENERAL INDEX

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ABBREVIATIONS:

Ed. — Editorial; DL — The doctor and his leisure; BN — Brief Note; AWT — Around the Willow Tree; 1000 — Thousand Word Series; C — Correspondence.

THE NOVA SCOTIA MEDICAL BULLETIN

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Dr. C. J. W. Beckwith

1903-1975

Dr. C. J. W. (Charlie) Beckwith died on April 30th. With his passing, the sick of Nova Scotia, indeed the sick of Canada, lost one of their staunchest advocates. Equally, the profession of this province lost a man who had devoted fifteen years of his life to the improvement of the lot of his professional brethren — financial yes — but more importantly to ensure that they might practise their profession under conditions that made it possible to provide the highest quality of medical care for the sick of this province.

The facts of Charlie Beckwith's life are well known. Graduating M.D., C.M. from Dalhousie in 1927, he entered postgraduate training in obstetrics and gynecology at the Royal Victoria Hospital in Montreal. No less an authority than H. B. Atlee has told me on more than one occasion that, if Charlie had not developed tuberculosis, he would almost certainly have attained the Chairmanship of the Department of Obstetrics and Gynecology at McGill, but he did develop tuberculosis and, while commiserating with him, one cannot help but feel that this was the bad wind that blew Nova Scotia great good. He returned to the Sanitarium at Kentville and after a period there, which included some of the earliest chest surgery in the province, he recovered and, undaunted, prepared himself for a distinguished career in internal medicine and chest diseases.

In 1936 he received the first Rockefeller Fellowship to be granted in Nova Scotia. He obtained his diploma in Public Health and returned to Cape Breton where he developed the first health unit on that island. Nine years later he moved to

Halifax to become the Superintendent of the Halifax Tuberculosis Hospital and to join the staff of the Department of Medicine at Dalhousie. One has only to talk to almost any Cape Bretonner of his vintage to hear the praises of Charlie Beckwith as a doctor and as a man proclaimed.

In Halifax he was to have the same success, as a teacher, as a doctor, as a person. In the troublesome times surrounding the reorganization of the Department of Medicine, he was a leading member of the Interim Committee which preceded the appointment of Dr. R. C. Dickson as Professor of Medicine at Dalhousie.

In 1956, after much soul-searching, he felt that there was an opportunity to serve the public of Nova Scotia and his profession and became the first full time Executive Secretary of The Medical Society of Nova Scotia — a post that he developed and brought distinction to until his retirement because of illness in 1968. He remained as a consultant to The Medical Society of Nova Scotia until the time of his death.

Many honours were heaped on him. An Honorary Degree from Dalhousie during the Centennial celebrations; the Presidency of the Nova Scotia Tuberculosis Association; the Canadian Tuberculosis Association and the Nova Scotia Rehabilitation Council. He was a consultant to all of the major hospitals in this city and received Honorary Membership in The Medical Society of Nova Scotia and of the Nova Scotia Tuberculosis Association.

He married Hazel Pearson in 1930 — a marriage which was to prove a source of great support and satisfaction to him. He had one son, Pearson, now Musical Director for the famous Ann Murray. To Pearson we extend our sympathy in his great loss, but also say that Charlie was filled with pride in your accomplishments, not neglecting the grandson who delighted the last few months of his life.

These then are the known public details of Charlie's life, but I cannot refrain from speaking of him as I have known him in several roles. The first was as a physician giving skilled care to a member of my family who was ill and at the same time that he gave good medical attention, acted as a great doctor in providing counsel and cheer for both patient and relatives. The second contact with him was in innumerable hours in committee and society meetings, when his great knowledge of medicine and its economics, integrated with his sense of fair play and his mature judgment, became largely responsible for providing Nova Scotians and Nova Scotia doctors with one of the best Medical Services Insurance plans in the world.

Finally, I must speak of him as a friend, a man with true gentlemanly qualities and with great dignity and above all, with an optimistic and hopeful attitude toward life which never was lost. I saw him four days before he died. My routine enquiry as to his health brought the informed and cheerful response "good enough". Having reassured me, he then discussed the future — a future he was well aware of, which he approached with his usual courage and dignity.

In the name of all his patients, his friends and his colleagues, I cannot find a more adequate description of a life devoted to the best of medicine and the best of human relationships than his own phrase repeated even at the height of adversity — "Good enough". Your life was "good enough" Charlie — it would be awfully hard to do any better. □

R.O.J.

SEA FEVER

I must go down to the seas again, to the lonely sea and the sky,
And all I ask is a tall ship and a star to steer her by;
And the wheel's kick and the wind's song and the white sail's shaking,
And a grey mist on the sea's face, and a grey dawn breaking.

I must go down to the seas again, for the call of the running tide
Is a wild call and a clear call that may not be denied;
And all I ask is a windy day with the white clouds flying,
And the flung spray and the blown spume, and the sea-gulls crying.

I must go down to the sea again, to the vagrant gypsy life,
To the gull's way and the whale's way where the wind's like a whetted knife;
And all I ask is a merry yarn from a laughing fellow-rover,
And quiet sleep and a sweet dream when the long trick's over.

John Masefield

Location and Type of Practice of Dalhousie Medical Graduates, 1950 to 1970

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A previous report[1] presented data on medical manpower in Nova Scotia in 1972. It showed that the ratio of population per physician was similar to the Canadian average, but emphasized that the latter ratio should not be used as a standard of adequacy for three reasons:

1. Since Medical Services Insurance for the whole population had only been introduced in 1969, the growing demand for medical services had probably not yet reached its optimum in 1972.
2. There were shortages of general practitioners and of specialists in some provinces of Canada, which affected the Canadian ratio adversely.
3. The extent to which community health nurses or physician-assistants might meet some of the need for health services, thus reducing the requirement for physicians, was still completely unknown.

An earlier study of the Dalhousie graduates from 1949 to 1963[2] was the basis upon which the Faculty of Medicine of Dalhousie University had decided to increase the medical class from 60 to 96 students per year, with the construction of the Sir Charles Tupper Medical Building. Because hospital facilities in Halifax would be inadequate for the clinical training of more than 96 medical students per annual class, that study also suggested the need for a second medical school in the Atlantic Region by 1970. This school has since been established at Memorial University of Newfoundland.

The 1964 study showed that 66 percent of the graduates of 1949 to 1963 were practising in the Atlantic Provinces, with 48.5 percent of these in general practice. Of the general practitioners who came originally from the Atlantic Provinces, 80 percent remained to practise in the Atlantic Provinces. Only 9 percent of students who came to Dalhousie from other provinces of Canada or other countries set up general practice in the Atlantic Region after graduation. The proportion of specialists remaining in the region after post-graduate training was significantly lower than for general practitioners, approximately 59 percent. Of those still in post-graduate training, 63.5 percent were in hospitals of the Atlantic Provinces. It would require the retention of almost all of these to raise or even maintain the supply of specialists at the existing level.

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It was estimated in 1964 that a class of 96 students would provide a sufficient number of graduates to replace the loss of physicians by death and retirement and to maintain the existing physician-population ratio for the projected increase in population of the Atlantic Provinces. However, any improvement of the ratio, then decidedly below the Canadian average, would require a second medical school or the retention of a higher proportion of Dalhousie graduates in the region, or both. The in-flow of doctors from other provinces or countries was then insufficient to influence significantly the ratio of population per physician.

The lapse of time since 1964 warrants a review of all these factors. The increase in immigration of physicians has apparently had a greater effect in the last ten years than was anticipated in 1964. There has been an upward trend in the proportion of recent graduates entering general practice and a downward trend in the proportion entering specialty training immediately after graduation. It is important to determine whether this may be off-set by an increase in the flow of general practitioners into specialties after a few years in practice. Population growth has also been somewhat less than was estimated in 1964. The inter-play of these trends warrants further examination in order to permit reasonable estimates of the future supply of physicians for the Atlantic Region as a whole and for each province.

The purposes of the present study are, then, to determine:

1. The number of Dalhousie medical graduates of 1950 to 1970 entering general practice and the specialties;
2. Changing trends in the proportions entering general practice and the specialties;
3. The length of time in general practice of those who later entered specialty training;
4. The number of Dalhousie graduates practising in each of the four Atlantic Provinces;
5. The proportion of students who returned to their home province;
6. Changing trends in the proportion of graduates remaining in the region and in each province;
7. The extent of the in-flow of physicians from other provinces of Canada or from other countries;
8. The extent to which the physician requirements of the Maritime Provinces will be met by Dalhousie Medical School and by immigration.

METHODS

A follow-up has been conducted on each member of the graduating classes of Dalhousie Medical School from 1950 to 1970 inclusive, a period of 21 years. The records in the offices of the Dean of Medicine and the Medical Alumni Association of Dalhousie were the chief sources of information. Data were compiled on standard forms for each graduate, and the analysis was done by computer.

During the whole period of this study the Dalhousie M. D. degree was granted at the end of the interneship year, and graduates were eligible to enter practice when licensed by a provincial medical board.

The registers of the Provincial Licensing Boards were the source of data on the physicians from other universities who entered practice in the Atlantic Provinces.

RESULTS

Table I shows the number of Dalhousie medical graduates by year of graduation from 1950 to 1970 and the number who were successfully followed up to 1971. For those whose record of practice was incomplete or who died during the twenty-one year period, the number of person-years of practice was calculated from year of graduation to year of last record or of death.

TABLE I

Number of Dalhousie Medical Graduates by Year of Graduation, 1950 to 1970, and Number Successfully Followed-Up to 1971.

Class	No. of Graduates	Complete Follow-Up	Partial Follow-Up	Died	Person-Years Before Loss
1950	45	42	1	2	2
1951	55	51	2	2	26
1952	53	49	—	4	53
1953	56	55	—	1	15
1954	54	51	—	3	47
1955	48	46	—	2	21
1956	51	50	—	1	2
1957	49	48	1	—	1
1958	56	53	2	1	16
1959	52	52	—	—	—
1960	50	50	—	—	—
1961	49	49	—	—	—
1962	50	50	—	—	—
1963	52	51	—	1	7
1964	43	41	—	2	10
1965	52	52	—	—	—
1966	56	56	—	—	—
1967	62	61	1	—	4
1968	63	63	—	—	—
1969	63	63	—	—	—
1970	64	64	—	—	—
Total No.	1123	1097	7	19	204
%	100	97.7	0.6	1.7	
Person-Years					
Possible	11,975				
Complete	11,765	11,561	26	178	
Lost	210				

The average number of graduates during the period was just over 53 per year. The entering class was 58 during the 1950's, gradually rising to 72 during the 1960's with a resulting increase in the number of graduates from 1966 onward. The opening of the Sir Charles Tupper Medical Building in 1967 permitted a further increase of the entering class to 96, but the first of the larger classes did not graduate until 1972. Therefore, the effect of the latest increase in enrolment is not reflected in this report.

The study was successful in obtaining follow-up data on 97.7 percent of the graduates, an unusually high proportion. Only seven individuals were lost from observation, and data were available on these seven for a total of 26 person-years, an average of more than 3.7 years each. Nineteen of the graduates of 1950 to 1970 died before December 31, 1971. They had practised a total of 178 person-years, an average of slightly over nine years each.

If all 1123 graduates had been followed until 1971 the number of physician-years of practice would have been 11,975 in complete years from the date of graduation to the comparable date of 1971. A closer estimate of the person-years of practice was not possible, since the records did not show the month that practice was started after graduation. The follow-up study covered 11,561 person-years of those with records to 1971, and an additional 204 person-years of those who died or were lost to observation. The follow-up therefore covered 98.2 percent of the total possible person-years of practice.

All of those who were lost from observation were in general practice at the time of the last record. Also, all but one of the 19 who died were general practitioners. There were eighteen deaths among 503 general practitioners and one death among 563 specialists or post-graduate trainees in the specialities. The difference seems to be highly significant statistically, but an investigation of the comparability of the two groups in duration of follow-up, or of the cause of death, is outside the scope of this study.

Types of Practice

Table II shows the 1971 status of the 1,123 graduates indicating for each five year period how many were in general practice, specialty practice, military service, full-time non-clinical work (administration, teaching or research), or still in post-graduate training. The percentage distributions are based on the total number of graduates in each time period (b), and on the graduates in general practice or specialties (c). Since the numbers entering military service varied from one to ten per year, and were highest in the 1965-1970 period, section (c) gives a clearer indication of the ratio of general practitioners to specialists.

It was somewhat surprising to note that seven graduates of the 1950-54 period were in post-graduate training in 1971 and another eight of the 1955-59 graduates. Approximately three percent of Dalhousie medical graduates had entered a residency training program as late as ten to twenty years after graduation. However, as one would expect, most graduates choosing to enter a specialty did so on graduation

or shortly afterward. The largest numbers in post-graduate study were therefore in the classes of recent years, 10.2 percent of those who graduated in the period 1960-64, and 40.2 percent of those who gradutated in the period 1965-69.

TABLE II

Dalhousie Medical Graduates by Five-Year Period Classified by Type of Practice or Employment in 1971[1]

(a) Number of Graduates

Year of Graduation	No. of Graduates	1971 Practice or Employment: Gen. Pract.	Specialist	Post-Grad.	Military	Non Clin.	Total Excluding Military & Non-Clin.
1950-54	263	116	129	7	7	4	252
1955-59	256	112	127	8	7	2	247
1960-64	244	92	116	25	5	6	233
1965-69	296	141	20	119	11	5	280
1970	64	42	0	14	8	0	56
Total:	1123	503	392	173	38	17	1068

(b) Percentage of Total Graduates

1950-54	44.1	49.0	2.7	2.7	1.5
1955-59	43.9	49.6	3.1	2.7	0.8
1960-64	37.7	47.5	10.2	2.0	2.5
1965-69	47.6	6.8	40.2	3.7	1.7
1970	65.6	0	21.9	12.5	0
Total:	44.8	34.9	15.4	3.4	1.5

(c) Percentage, Excluding Military & Non Clinical

1950-54	46.0	51.2	2.8
1955-59	45.3	51.4	3.2
1960-64	39.5	49.8	10.7
1965-69	50.4	7.1	42.5
1970	75.0	0	25.0
Total:	47.1	36.7	16.2

[1]Or at time of death, or last record of those with partial follow-up.

The proportion in general practice averaged 44.8 percent of the total. There seemed to be a small reduction in the five-year period 1960-64 with 37.7 percent, as compared with the two earlier periods, 44.1 and 43.9 percent respectively. Correcting for differences due to variation in military and non-clinical groups apparently showed the same downward trend, with 46.0, 45.3 and 39.5 percent in general practice in the three five-year periods. This was apparently followed by a rise in the years 1965-69. However, an examination of the data for each of the 21 classes, rather than the five-year averages, showed that the proportion in general practice in 1971 could be fitted by a straight line at approximately the 45 percent level, with no upward or downward slope from 1950 to 1967. There were fluctuations, usually between 38 percent and 50 percent, with only two higher peaks to 58 and 54 percent for the classes of 1952 and 1959 respectively, and one sharp drop to 26.5 percent for the class of 1960. But there was no indication of any upward trend until 1968. Since that year there has apparently been a steady rise in the proportion of general practitioners. However, all of these data show the distribution in practice in 1971, and the proportions may not have stabilized, particularly for the classes of recent years. Even those who graduated 16 to 21 years earlier had a small number moving from general practice to specialty training and practice. None of the 1971 figures can therefore be considered the final distribution between general practice and the specialties.

Table III indicates more effectively the flow into general practice and into specialty training and practice. It shows the percentage in each of these categories immediately after graduation and at five-year intervals. The distribution has already been shown to fluctuate somewhat from one annual class to another, and the number in any class is too small to produce a reasonably trustworthy percentage. Table III therefore shows the data only to the final year that includes all five classes and is thus based on more than 200 graduates. However, records on individual classes were available for an additional one to four years.

Graduates who were in the military services in 1971, or in non-clinical employment were excluded, leaving 1068 of the 1123 graduates or 95 percent.

TABLE III

Division of Graduates[1] Between General Practice and Specialty Training or Practice After Graduation, at 5 Year Intervals and at end of Observation.

Year of Graduation	Practice	Years after Graduation: 0	5	10	15	(17 Yrs)
1950-54	% Gen. Pract.	60.7	59.2	53.6	51.4	51.2
	% Post. Grad.	39.3	7.7	2.4	1.6	0.9
	%Specialty	0	33.1	44.0	47.0	47.9
	Total No:	252	248	248	247	246
						(12 Yrs)
1955-59	% Gen. Pract.	72.4	60.3	51.0		49.6
	% Post. Grad.	27.6	19.1	5.7		5.7
	% Specialty	0	20.6	43.3		44.7
	Total No:	247	247	247		246
						(7 Yrs.)
1960-64	% Gen. Pract.	60.1	68.5			58.0
	% Post. Grad.	39.9	15.6			10.4
	% Specialty	0	15.9			31.6
	Total No:	233	232			231
						(2 Yrs.)
1965-69	% Gen. Pract.	67.9				50.5
	% Post. Grad.	32.1				42.3
	% Specialty	0				7.2
	Total No:	280				279
1970	% Gen. Pract.	75				
	% Post. Grad.	25				
	% Specialty	0				
	Total No:	56				

[1]The total of 1068 excludes those in military or non-clinical work in 1971.

For the most part the proportion in general practice decreased progressively from graduation to the end of the period of observation in 1971. However, there was a flow in both directions. Some who started in residency training after graduation later went into general practice. Similarly, some moved from military service to civilian general practice or residency training. As a result, the proportion in general practice was sometimes higher two to five years later than it was immediately after graduation. For example, the classes graduating in 1960-64 had 60.1 percent enter general practice and this rose to 68.5 percent at the end of five years.

The five-year averages of those entering general practice immediately after graduation fluctuated considerably with 60.7, 72.4, 60.1, 67.9 percent respectively, in the four time periods. It reached 75 percent for the single class of 1970.

There was still considerable fluctuation in the proportion in general practice five years after graduation, with 59.2, 60.3 and 68.5 percent respectively in the classes of 1950-54, 1955-59 and 1960-64. However, the distribution seemed to stabilize at about the same level ten years after graduation. The classes of 1950-54 had 51.2 percent in general practice 17 years after graduation, the classes of 1955-59 had 49.6 percent twelve years after graduation, and the classes of 1960-64 had 58.0 percent at seven years. It was down to 50.0 percent for the two classes in that group, 1960 and 1961, which were followed ten years. Furthermore, the classes of 1965-69 had only 50.5 percent in general practice two years after graduation.

These data suggest that the division between general practitioners and specialists, excluding the five percent in the military and non-clinical groups, tends to stabilize at about a 50-50 ratio, but with a range of plus or minus 8 for individual classes.

It has already been indicated after Table II, that the individual classes from 1950 to 1967 did not show any significant trend in the proportions remaining in general practice to 1971. However, the percentage of each class going into general practice immediately after graduation rose in the years 1968, 1969 and 1970. An unexpected delay in the reporting of this 21 year follow-up, permits the inclusion of some data on later classes, not otherwise included in this analysis.

In the classes of 1970 to 1974, inclusive, the proportions entering general practice after graduation were respectively 65.6, 77.9, 76.4, 74.2 and 74.4 percent. Excluding military and non-clinical groups, as in Table III, the percentages in general practice from 1970 to 1974 were respectively 75, 89.9, 86.7, 82.5 and 81.7. The 1970-74 average of 83.3 was higher than any of the previous five-year periods which were 60.7, 72.4, 60.1 and 67.9 percent respectively.

It is important to determine whether this increase indicates a permanent trend toward general practice, or may be reversed by a larger inflow into specialty training later. Table III provides some possible clues.

An increase in those entering general practice after graduation occurred in 1955-59, with 72.4 percent as compared with 60.7 percent in 1950-54. But at the end of five years the proportion in general practice was essentially the same, 59.2 percent of the 1950-54 group and 60.3 percent of the 1955-59 group. At 17 years and 12 years respectively the proportion in general practice was slightly but not significantly lower in the 1955-59 group. An increase in those entering general practice on graduation does not, therefore, ensure that more will remain.

In a further effort to determine whether the increase in the percentage entering general practice since 1968 might be permanent, the classes of 1968, 1969 and 1970 were followed up to 1974, as shown in Table IV.

The two classes of 1968 and 1969 had 54.0 and 57.1 percent remaining in general practice in the fifth year after graduation. The class of 1970 was followed only four years and had not yet shown a significant decrease, with 71.9 percent still in general practice. The figures for the classes of 1968 and 1969 are well within the ranges shown in Table III five years after graduation, and the 1970 figure of 71.9 percent is not significantly different from the average of 68.5 percent for the classes of 1960-64. There is no reason to assume, therefore, that the higher percentages entering general practice in recent years will have a permanent result. Nevertheless, the graduates who devote several years to general practice before entering specialty training make a significant contribution to primary health care, which must be considered in estimating the future requirements for general practitioners. In the 21-year period 188 general practitioners who entered residency training one to 15 years after graduation provided 781 physician years of general practice,

TABLE IV

Graduates[1] of 1968, 1969 and 1970 in General Practice or in Specialty Training or Practice on December 31, 1974.

Year of Graduation	Practice	No. or %	Years After Graduation						
			0	1	2	3	4	5	6
1968	Total	No.	53						
	Gen. Pract.	%	84.1	84.1	79.4	57.1	55.6	54.0	54.0
	Post. Grad.	%	15.9	15.9	20.6	42.9	28.5	30.1	25.4
	Specialty	%	0	0	0	0	15.9	15.9	20.6
1969	Total	No.	63						
	Gen. Pract.	%	82.5	82.5	68.3	63.5	60.3	57.1	*
	Post. Grad.	%	17.5	17.5	31.7	36.5	22.2	25.4	
	Specialty	%	0	0	0	0	17.5	17.5	
1970	Total	No.	64						
	Gen. Pract.	%	78.1	82.8	81.3	71.9	71.9		
	Post. Grad.	%	21.9	17.2	18.7	28.1	10.9		
	Specialty	%	0	0	0	0	17.2		

[1]Excluding military and non-clinical.

an average of 4.1 years. Fifty percent of them entered residency training two or three years after graduation, but the 15 percent who practised six to 15 years raised the average to 4.1 years.

Three factors have been suggested as the cause of the recent trend toward general practice among Dalhousie graduates. Most of these suggestions seem to be based on the assumption that it is more permanent than this study would indicate. The obvious one is the introduction of Medical Services Insurance in 1969. This provided a more adequate and assured income for a general practitioner. However, there had also been several reports warning that the number of specialists in Canada had reached or closely approached the saturation point, and these were thought to have influenced graduates in reaching a decision against specialization. Increasing emphasis on family practice in the Dalhousie educational program was also said to have had an effect on recent classes. However, none of the graduates included in this study had the benefit of clinical experience in the Family Medicine Centre, which was opened in 1970, and the trend toward general practice immediately after graduation began in 1968. Dalhousie has had a general practice preceptorship since 1962 and this may have had an influence.

It should also be noted that the proportion of Dalhousie medical graduates entering general practice has never fallen to the low levels experienced by some Canadian medical schools and most schools in the U.S.A. The well-organized and balanced rotating interneship required by Dalhousie was probably an important factor.

Of the 89 graduates who entered the military services after graduation 38 remained in 1971. There was relatively little reduction five years after graduation but at ten years the figure was reduced to about two-thirds and at 15 years to half the initial number.

Geographic Distribution

Although Dalhousie Medical School is located in Nova Scotia, it has never been solely a provincial institution. Until the opening of the Faculty of Medicine at Memorial University of Newfoundland in 1969 Dalhousie was the regional medical school for the four Atlantic Provinces, and it still serves the three Maritime Provinces. However, all of the classes of 1950 to 1970 included in this study were admitted before 1965 while the four provinces were included in Dalhousie's "constituency". The data on geographic distribution are therefore presented for the four provinces.

The policy of the Medical School during the whole period was to reserve 90 percent of the positions in the first year class for residents of the Atlantic region and to limit enrolment from other provinces of Canada or other countries to 10 percent. However, when the numbers of qualified candidates from the Atlantic Provinces was inadequate, the proportion of non-residents was increased to keep each class at full complement. In the present circumstances, when Dalhousie, like every other medical school in Canada and the U.S.A., is receiving far more applications than can be accepted, it is difficult to credit the fact that there were too few regional applicants during most of the 21-year period to fill the medical school, which then had only slightly more than half the capacity of the present one.

Table V shows the number of students admitted from the Atlantic Region by five year periods from 1945 to 1965, and the number who graduated five years later, 1950 to 1970.

Admissions to first year medicine in the period 1945 to 1965, numbered 1281 and graduates five years later totalled 1123. The ratio of admissions to graduations averaged one to 0.88. The number graduating cannot be accurately expressed as a percentage of the admissions five years earlier to indicate the rate of academic success. The reduction is due to a combination of events, including academic failures, voluntary withdrawals from the study of medicine, transfers to other medical schools and, in a few instances, death, while on the positive side there were some admissions to advanced standing from other medical schools; a small number were also permitted to repeat one year after an academic failure or because of illness. Defining "wastage" as the combination of these negative and positive

TABLE V

Regional Distribution of Students Admitted, 1945-65, and Graduates, 1950-70.

	Total			From Atlantic Region				
				Admitted[1]		Graduated		Ratio[2]
Year of Graduation	Admitted[1] No.	Graduated No.	Ratio[2]	No.	% from Atlantic Region	No.	% from Atlantic Region	from all Regions
1950-54	266	263	.99	260	97.7	251	95.4	.96
1955-59	291	256	.88	265	91.1	230	89.8	.87
1960-64	300	244	.81	233	77.7	188	77.0	.80
1965-69	348	296	.85	271	77.9	219	74.0	.81
1970	76	64	.84	70	92.1	57	89.1	.81
Total:	1281	1123	.88	1099	85.8	945	84.1	.86

[1]Numbers admitted 5 years earlier, 1945-49, etc.

[2]No. admitted: No. graduates, e.g. 1:0.88

factors, Dalhousie had a wastage of 12 percent over the 21-year period, varying from a low of 1 percent for the 1950-54 classes to a high of 19 percent for the 1960-64 period.

The very low wastage rate of 1 percent in 1950-54 was in part due to transfers to Dalhousie on advanced standing into the later years of the medical class. This is illustrated by the fact that twelve non-residents graduated during that period, while only six had been admitted to the first year classes five years earlier. Nevertheless, the wastage rate was only 4 percent for residents of the Atlantic Provinces during that five-year period. Most of the students were mature and highly motivated veterans, and the few non-veterans who gained admission were of exceptionally high academic standing.

After 1950 there was a rapid drop in the number of applicants for admission to medicine in almost every medical school in Canada and the U.S.A. At Dalhousie the downward curve "bottomed out" in 1958, when there were only 43 regional applicants for a class of 58. Almost all were admitted, although many were recognized to be of border-line academic standing. There was a resulting increase in the failure rate.

Table V therefore shows that the classes graduating in 1960-64 had only 77.7 percent from the Atlantic Provinces among those admitted and 77.0 percent among those graduating. The 90 percent quota could not be filled by students from the region. The wastage was 19 percent as compared with 4 percent in the 1950-54 veteran classes.

The number of applicants increased gradually after 1960 but did not reach an adequate level until 1965. The 90 percent quota could still not be filled by qualified regional candidates, although the standards for acceptance were relatively lenient. There was consequently a higher wastage among Atlantic province students, as shown by the fact that 77.9 percent of the admissions were from the region but only 74 percent of the graduates. Only in the 1970 graduating class did the percentage of Atlantic Province students rise to 89.1 percent, but the wastage was still a high 16 percent.

It should be noted that the policy on admissions was to accept all students from the Atlantic Provinces who had a reasonable chance of success in the difficult medical course. Although there was a significant wastage, the policy was vindicated in part by the fact that some students, classified as border-line on admission, were in the upper one-third of their class on graduation. Furthermore, as will be shown later, graduates from the Atlantic Region were more likely to practise here. The Dalhousie policy on admissions therefore favoured the Atlantic Region not only by providing opportunity for students to obtain a medical education but by improving the physician manpower of the region.

Since 1968 there has been a phenomenal upsurge in the number of applications for admission to medical schools. The competition is therefore much greater and the academic records of those admitted is much higher. The circumstances have changed so extensively that one hesitates to use the average wastage rate of 12 percent for future projections, or the even worse rate of 19 to 20 percent shown by Atlantic Province students graduating between 1960 and 1970. To obtain a more up-to-date estimate of the wastage the follow-up study was extended to 1974. This shows an average wastage in the five-years 1970-74 of 11.3 percent, but the figures for the individual years were 14.7, 17.1, 11.4, 9.1 and 6.2 respectively. The classes now in progress through the medical school are experiencing a wastage of about 6 percent. The lower wastage can be attributed in part to the higher academic standing of the students admitted to first year and probably also to the new curriculum introduced in 1968.

Table VI shows the provincial distribution of the 945 graduates whose homes had been in the Atlantic Provinces on admission to Dalhousie.

TABLE VI

Home Province of Graduates from the Atlantic Region by Five-Year Periods

Year of Graduation	No. & %	Province of Origin								
		Nova Scotia		New Brunswick		P.E.I.		N'fld.		Total
1950-54	No.	141		54		31		25		251
	%		56.2		21.5		12.4		10.0	
1955-59	No.	112		58		27		33		230
	%		48.7		25.2		11.7		14.3	
1960-64	No.	101		39		20		28		188
	%		53.7		20.7		10.6		14.9	
1965-69	No.	105		52		23		39		219
	%		47.9		23.7		10.5		17.8	
1970	No.	29		11		2		15		57
	%		50.9		19.2		3.5		26.3	
Total:	No.	488		214		103		140		945
	%		51.6		22.6		10.9		14.8	
Provincial Population %			38.9		31.4		5.7		24.0	

Of the 945 from the Atlantic Provinces 51.6 percent were Nova Scotia residents on admission to medical school; 22.6 percent were from New Brunswick, 10.9 percent from Prince Edward Island and 14.8 percent from Newfoundland. There was some fluctuation during the period but for the most part the proportion of students from each province was relatively stable. However, as shown in Table VI, the average population in the census years 1951, 1961 and 1971, expressed as a percentage of the Atlantic Provinces population, differs significantly from the distribution of medical graduates. Proportionately more students came from Nova Scotia and Prince Edward Island than from New Brunswick or Newfoundland.

The proportion of young people who choose medicine as a career varies from province to province and , in the U.S.A., from state to state. For over twenty years Prince Edward Island has had a higher rate of "recruitment" into medicine per 100,000 population than any other province in Canada, and most states in the U.S.A.[3] Although some students from each province obtain a medical education in other universities, the Dalhousie data reflect these provincial differences.

Table VII shows the ratio of the 1961 census populations of the three larger provinces to that of Prince Edward Island, compared with ratio of students admitted and graduated.

Nova Scotia has a population seven times that of Prince Edward Island, but had only 4.7 times the number of medical graduates. New Brunswick with a population of 5.7 times that of P.E.I. had only 2.1 times the number of medical graduates. The Newfoundland population ratio was 4.4 in relation to P.E.I. and the medical graduates ratio was 1.4.

These differences between provinces are essentially the same for the number of applicants, the number admitted and the number graduating and are not related to the selection of first year students. No preference was given to applicants from any of the four provinces, and there have been no provincial quotas. Prince Edward Island and Nova Scotia have provided more qualified candidates per 100,000 of population and have accordingly had more graduates.

Table VIII shows the geographic location of practice or employment of the 1123 graduates in 1971 or at the time of the last record.

Of the 1123 graduates, 899 or 80.1 percent were in practice, employment or post-graduate training in Canada; 19.9 percent were in other countries, chiefly the British Commonwealth islands of the West Indies, and the United States.

TABLE VII

Comparison of Provincial Populations, with Medical Students Admitted and Graduated

Atlantic Province	1961[1] Population	Ratio To P.E.I. Population	Students Admitted 1945-65	Ratio to P.E.I.	Grads. 1950-70	Ratio to P.E.I.
Nova Scotia	737,007	7.0	541	4.0	488	4.7
New Brunswick	597,936	5.7	248	1.8	214	2.1
Newfoundland	457,853	4.4	174	1.3	140	1.4
Prince Edward Is.	104,629	1	136	1	103	1

[1]Census midway through the 1950-70 study.

TABLE VIII

Geographic Location of 1123 Graduates in 1971[1]

Year	Grads.	No. & %	Location of Practice or Employment							
			N.S.	N.B.	P.E.I.	N'fld.	Total Atlantic	Other Canadian	Other Countries
1950-54	263	No.	98	31	12	14	(155)	68	40
		%	37.3	11.8	4.6	5.3	58.9	25.8	15.3
1955-59	256	No.	87	29	7	20	(143)	60	53
		%	34.0	11.3	2.7	7.8	55.8	23.4	20.8
1960-64	244	No.	70	17	6	17	(110)	64	70
		%	28.7	7.0	2.5	7.0	45.1	26.2	28.7
1965-69	296	No.	109	31	8	22	(170)	66	60
		%	36.8	10.5	2.7	7.4	57.4	22.3	20.3
1970	64	No.	25	6	1	14	(46)	17	1
		%	39.1	9.4	1.6	21.8	71.8	26.6	1.6
Total:	1123	No.	389	114	34	87	(624)	275	224
		%	34.6	10.2	3.0	7.8	55.6	24.5	19.9

[1]Or at death or time of last record.

The Atlantic Provinces had retained 624, or 55.6 percent, which was lower than the 66 percent reported in the previous study for 1949-63. Disregarding the single year 1970, where the numbers are too small to yield significant percentages, the only feature of note was the reduction in the proportion of the graduates of 1960-64 who remained in the Atlantic Provinces and the increase in those practising in other Canadian provinces or other countries. This was the result of the dearth of candidates from the Atlantic Region for admission to the Medical School, as already noted.

Table IX shows the degree to which the selection of practice is influenced by the place of origin of the students. This provides data on the 895 graduates in clinical practice in 1971. It excludes 173 post-graduate residents whose location is determined by their choice of teaching hospital, and the 38 military physicians whose location is determined by their posting. This table shows the province of residence of the student on admission to Dalhousie Medical School and the 1971 location of the graduates in clinical practice. This table should be studied in association with Table X which shows the percentages of general practitioners and specialists separately. The two groups differ significantly in their geographic distribution.

The underlined numbers in Table IX show that, except for Prince Edward Island, the largest proportion of students from a province or region returned to that province or region to practise medicine. Of graduates whose home had been in the Atlantic Region on admission to Dalhousie Medical School, 66.1 percent were practising in these provinces in 1971. The three Maritime Provinces excluding Newfoundland had 65.1 percent practising in the area. Almost the same proportions, 64.6 percent, of students from other Canadian provinces were practising in Canada outside the Atlantic Region, and 68 percent of those from other countries were practising outside Canada, most of them in their home country.

However, Table X shows that in all four provinces a significantly higher proportion of the general practitioners than of the specialists returned to their home province or at least remained in the region. For the Atlantic Region as a whole 76.3 percent of the regional graduates who entered general practice were in the region in 1971 as compared with the 1964 figure of 80 percent. The proportion of specialists retained in the region was 53.9 percent, not only lower than for general practitioners, but significantly below the 1964 figure of 59 percent. Out-of-region emigration has therefore

TABLE IX

Location of Practitioners[1] by Place of Origin as Students

(a) Number of Practitioners by Place of Origin

Student's Home Province	Location of Practice: N.S.	N.B.	P.E.I.	N'fld.	Atlan. Prov.	Other Prov.	Other Countries	Total
N.S.	211	26	2	5	(244)	90	51	385
N.B.	30	68	1	3	(102)	44	30	176
P.E.I.	32	10	26	0	(68)	8	11	87
N'fld.	13	3	0	75	(91)	16	9	116
Atlantic Provinces	(286)	(107)	(29)	(83)	(505)	(158)	(101)	(764)
Other Provinces	6	1	1	1	(9)	20	2	31
Other Countries	8	2	1	0	(11)	21	68	100
Total	300	110	31	84	(525)	199	171	895

(b) Percentage of Practitioners by Place of Origin

N.S.	54.8	6.8	0.5	1.3	(63.4)	23.4	13.2
N.B.	17.0	38.6	0.6	1.7	(58.0)	25.0	17.0
P.E.I.	36.8	11.5	29.9	0	(78.2)	9.1	12.7
N'fld.	11.2	2.5	0	64.7	(78.4)	13.8	7.8
Atlantic Provinces	(37.4)	(14.0)	(3.8)	10.9	(66.1)	(20.7)	(13.2)
Other Provinces	19.4	3.2	3.2	3.2	(29.0)	64.6	6.5
Other Countries	8.0	2.0	1.0	0	(11.0)	21.0	68.0
Total	33.5	12.3	3.4	9.4	(58.7)	22.2	19.1

[1]Excluding military, post-graduate and non-clinical.

increased both in general practice and the specialties.

The location of specialists in the Atlantic Region was clearly influenced by their choice of residency training. Of 96 graduates who had specialty training in the Atlantic Provinces 83, or 86.4 percent, were practising in the region in 1971. Of 200 who had all of their residency in centres outside the region only 68, or 34 percent, returned to practise in the region. A group of 53 who had part of their specialty training in the region and part elsewhere were in an intermediate position with 69.9 percent practising in these provinces in 1971.

Newfoundland had 64.7 percent of their students return to the home province, and 78.4 percent remained in the Atlantic Region (90.4 percent of general practitioners and 64.1 percent of specialists). Students of the three Maritime provinces tended to remain in the region, but a smaller percentage returned to their home province. Nova Scotia had 54.8 percent in the province and 63.4 percent in the region (general practitioners 73.5 and specialists 51.2 percent). New Brunswick had 38.6 percent in the province and 58 percent in the region (general practitioners 69.0 and specialists 47.1 percent). Prince Edward Island had only 29.9 percent in the province but 78.2 percent in the Atlantic Region (general practitioners 83.3 and specialists 69.6 percent). Newfoundland and Prince Edward Island, therefore, had the lowest emigration from the region, 21.6 percent and 21.8 percent, respectively. New Brunswick's emigration was the highest, 42.0 percent to areas outside the Atlantic Region, and Nova Scotia's was almost as great, 36.6 percent.

The 1964 study had shown that only nine percent of the students from outside the Atlantic Region established practice in the region. This has since increased significantly, with 29 percent of students from other provinces of Canada and 11 percent of non-Canadian students remaining to practise in the Atlantic provinces after graduation, mostly in general practice.

It has sometimes been suggested that the location of a medical school in a province is a major factor in attracting graduates to practise there. This study shows that Newfoundland, which then had no medical school, had more of its graduates in practice than Nova Scotia. However, one of the major factors responsible for the return of a higher proportion of Newfoundland graduates to their home province may have been the system of Government subsidies for medical students, which required an equal number of years of practice in repayment. This was in operation during most, but not all, of the period of this study.

New Brunswick lost 30 graduates to Nova Scotia but gained 26 Nova Scotians in return. In relation to population this is a fairly even balance. In total, New Brunswick lost 34 graduates to the three neighbouring provinces but gained 39 from them, as well as three other non-resident Dalhousie graduates.

Newfoundland lost thirteen to Nova Scotia and gained only five from that province. The exchange between New Brunswick and Newfoundland was exactly even, three in each direction. In total Newfoundland lost sixteen and gained eight from the rest of the region as well as one non-resident.

TABLE X

Comparison of General Practitioners and Specialists by Location of Practice in 1971

Student's Home Province		Location of Practice: N.S.	N.B.	P.E.I.	N'fld.	Atlan. Prov.	Other Prov.	Other Countries	Total
N.S.	G.P. %	62.6	9.0	0.5	1.4	73.5	19.0	7.5	211
	Spec. %	45.4	4.0	0.6	1.2	51.2	28.7	20.1	174
N.B.	G.P. %	16.1	52.9	0	0	69.0	23.0	8.0	87
	Spec. %	17.9	24.7	1.1	3.4	47.1	27.0	25.9	89
P.E.I.	G.P. %	33.3	9.2	40.7	0	83.3	7.4	9.2	54
	Spec. %	42.4	15.2	12.1	0	69.6	12.1	18.3	33
N'fld.	G.P. %	11.1	1.6	0	77.7	90.4	8.0	1.6	63
	Spec. %	11.3	3.7	0	49.1	64.1	20.8	15.1	53
Atlantic Prov.	G.P.%	41.2	17.1	6.0	12.5	76.3	16.6	7.0	415
	Spec. %	33.0	10.3	1.7	8.9	53.9	25.5	20.6	349
Other Prov.	G.P.%	40.0	6.7	0	0	46.7	53.3	0	15
	Spec.%	0	0	6.3	6.3	12.6	74.8	12.6	16
Other Countries	G.P.%	10.0	3.3	0	0	13.3	21.6	65.1	60
	Spec.%	5.0	0	2.5	0	7.5	20.0	72.5	40
Total	G.P.%	37.3	15.1	4.7	10.6	67.7	18.4	13.9	490
	Spec. %	28.9	8.9	2.0	7.9	47.7	26.9	25.4	405

On the other hand, Prince Edward Island graduated 87 physicians, and retained only 26. Nova Scotia gained 32 of these, New Brunswick ten, other Canadian provinces eight and other countries, chiefly U.S.A., 11. In return for this "contribution" of 61 graduates, Prince Edward Island gained only three Dalhousie graduates from the other Atlantic provinces and two non-residents. If the graduates had returned to Prince Edward Island to the same extent as to Newfoundland, there would now be a reasonably adequate level of physician manpower in P.E.I.

In addition to the large in-flow of 32 from Prince Edward Island, Nova Scotia gained more than the rest of the region from the non-resident graduates who established practice in the region, 14 out of the total of 20.

It would require a special study to evaluate the factors which influenced graduates to choose the location of practice. Economic factors, size of community, the school system, availability and quality of hospital facilities and other factors no doubt play a role. This study gives little indication that the location of the medical school in Nova Scotia had a significant influence on the selection of Nova Scotia as the location of practice by graduates from New Brunswick or Newfoundland. If it was a factor at all, it seems to have had much less influence than the province of origin.

One factor which is sometimes said to influence the selection of the location of practice is the place of interneship. No data on this possible influence have been obtained in this study. The system of rotation used by Dalhousie resulted in many graduates having experience in hospitals of more than one province. It is not possible, therefore, to predict whether past trends will continue to hold true under the new system, in which some Dalhousie graduates will in future interne in hospitals outside the region. Presumably, if this factor is significant, it will also operate to attract some internes from other provinces to practise here. However, the data on the out-flow of residents trained elsewhere suggests the likelihood that the loss of graduates from the region may increase.

FUTURE PROJECTIONS

Based on the experience of 21 years, expanded in some instances to cover an additional three years, it is possible to estimate the contribution which Dalhousie Medical School will probably make to the physician manpower of the Maritime Provinces in the immediate future.

Table XI estimates the probable number of graduates by location and field of practice per year and over a five-year period, based on the following assumptions:

1. Continuation of the policy of admitting 90 percent of the students from the three Maritime Provinces.
2. A student wastage of 6 percent, as in the present classes.
3. Initial field of practice based on the five-year average of 1970-74, with 75 percent in general practice, 15 percent in residency training and 10 percent in military service.
4. Final field of practice based on the classes followed for 10 years or more in this study, 48 percent in general practice, 48 percent in specialties, 1.5 percent in non-clinical work and 2.5 percent in military medicine.

Of the 68 who are likely to enter general practice each year, approximately 43 will remain. The other 25 will, for the most part, enter residency training and eventually practise a specialty. Most of the 25 will be in general practice in the Maritime Provinces for an initial period averaging four years.

How adequately will the physician requirements of the Maritime Provinces be met by the annual addition of 50 graduates, 36 in Nova Scotia, ten in New Brunswick and four in Prince Edward Island?

Obviously the answer will depend largely upon what standard is established as a goal, but the first requirement will be to replace the loss of physicians and to provide for population growth. The Canada Health Manpower Inventory 1974[4] shows that the "attrition rate" of Canadian doctors from 1964 to 1973 averaged 2.92 percent, ranging from a low of 1.086 in 1972 to a high of 4.853 in 1968 (Table 15.3, p.115). This included loss by emigration from Canada as well as by death and retirement. The loss of Dalhousie graduates

TABLE XI

Estimate of Future Output of Dalhousie Medical Graduates

		Per Year	Per 5 Years
Students			
No. Admitted		96	480
Wastage		6	30
No. Graduated		90	450
Graduates from			
Maritime Provinces		81	405
(Nova Scotia	60%)	(49)	(243)
(New Brunswick	27%)	(22)	(110)
(P.E.Island	13%)	(10)	(52)
Other Provinces		5	25
Other Countries		4	20
Initial Field of Practice			
General Practice		68	338
Post Graduate		13	67
Military		9	45
Final Field of Practice			
General Practice	48%	43	216
All specialties	48%	43	216
Military	2.5%	2	11
Non-Clinical	1.5%	1	7
Location of Practice			
Maritime Provinces	55.6%	50	250
(Nova Scotia)		(36)	(180)
(New Brunswick)		(10)	(50)
(P.E. Island)		(4)	(20)
Other Provinces	24.5%	22	110
Other Countries	19.9%	18	90

by emigration has already been taken into account in arriving at the net figure of 50 new practitioners per year. Loss by death and retirement may be estimated at approximately 2.5 percent per year, assuming a professional life averaging 40 years from graduation at 25 years to retirement at 65. There are no available data on the age distribution of the present physician population in the Maritime Provinces nor on the attrition by death and retirement in recent years. Such data will be available soon for Nova Scotia in the new statistical system now under development by the Provincial Medical Board. The estimate based on 2.5 percent is believed to be a reasonable approximation.

Table XII shows the number of clinicians by province in 1973 as reported by Canada Health Manpower Inventory 1974,[4] excluding internes and residents and physicians devoting most of their time to non-clinical work. It shows also the ratio of population per clinician, the estimated loss of physicians per year and the requirement to maintain the existing ratio as the population grows. The estimate of population increase for each province is based on that from 1972 to 1973 as contained in Appendix Table I of Canada Health Manpower Inventory 1974.[4]

TABLE XII

Estimated Future Requirements for Physicians in the Maritime Provinces

Province	Clinicians in 1973[1]	Population per Clinician	Physician Loss per Year	Growth Requirement	Minimum Annual Requirement
Nova Scotia	910	1:890	23	18	41
New Brunswick	473	1:1391	12	5	17
P.E. Island	100	1:1160	2	3	5
Maritimes	1483	1:1068	37	26	63
All Canada	27,304	1:817	—	—	—

[1]Total of general practitioners and specialists, Canada Health Manpower Inventory, 1974.

A minimum of 63 clinical practitioners will be required each year simply to maintain the present ratio of population per physician in the Maritime Provinces. In addition there are 156 physicians in the region who are not in private practice. They spend all or most of their time in one of the following areas, according to Canada Health Manpower Inventory 1974 — research medicine, teacher-medicine, administration-government, administration-business, staff physician in hospital, medical director-pharmaceutical industry, etc. In the opinion of the authors these 156 physicians should not be included in the population per physician ratio, since their numbers relate to the size and complexity of hospitals, medical schools, governments, industry, etc., rather than to the size of the population. However, replacement of their loss at 2.5 percent per year would require an additional four physicians, bringing the annual requirement to 67.

The requirement for internes and residents should not be related directly to population either, and it has been excluded from the estimates in Table XII. It is fully recognized that internes and residents provide clinical services to patients. However, their number is governed by the location and size of the post-graduate training programs of the medical schools and teaching hospitals, not by the population growth. It is also very doubtful whether both the post-graduate student and the clinician-teacher should be counted as though both were full-time clinical practitioners. In most fields, the specialist who is supervising an interne or resident would be able to care for more patients if he was not combining teaching with clinical care. On the other hand, the post-graduate student is devoting part of his time to study. The deletion of one group, or the arbitrary classification of each at 50 percent, would give a more accurate ratio of population per physician. In any event, the inclusion in the Nova Scotia statistics of almost all of the internes and residents of the Maritime Provinces, as in the Canada Health Manpower inventories, gives a false impression of the differences between provinces in the region and exaggerates the Nova Scotia ratio. For example, Canada Health Manpower Inventory 1974 shows the ratio of one physician per 599 persons in Nova Scotia, but it is one to 890 if internes, residents and non-clinicians are deleted. At best it should be one to 802 if the latter group were included.

To meet this minimum requirement of 67 physicians per year, Dalhousie will provide 50 graduates who will remain permanently in the area. To this should be added ten to 12 who will spend an average of four years in general practice. As already noted, a total of 25 Dalhousie graduates spend some time in general practice before going into post-graduate training, but 53.1 percent return to practice in the region and are already included in the estimate of 50. Of the 12 who will practise outside the region after specialty training, most will do their preliminary stint of general practice in the Maritimes. It is therefore estimated that an additional ten to 12 per year will bring the total manpower contribution of Dalhousie to 60 or 62.

Obviously, too, Dalhousie is not the only source of Canadian medical graduates for the Maritime Provinces. Some Maritime province students are now being admitted to Memorial University of Newfoundland and may help to augment the physician supply of the Maritimes in future years. In addition a few graduates of McGill and the Ontario medical schools return to practise here. Of more importance, approximately 40 percent of the population of New Brunswick is French-speaking, and their medical students usually choose to go to one of the three French-language medical schools in Quebec. If 40 percent of the annual requirement of 17 physicians for New Brunswick were to come from Quebec medical schools, the Dalhousie output of ten would approximately meet the requirements of the English-speaking population of that province, and the seven French-speaking graduates would bring the annual increase to 67.

Unfortunately the number of French-speaking graduates from 1966 to 1973 has averaged less than two (12 in seven years), while there has been a greater loss of the older practitioners, a net loss of three per year (21 in seven years). The inadequate replacement of the Francophone physicians is a serious problem, which is not likely to be met by the retention of more Dalhousie graduates in the region, if it could be achieved, nor by an increased enrolment of

English-speaking New Brunswick students at Memorial University of Newfoundland.

To improve the population per physician ratio in the Maritime Provinces there will obviously have to be a greater rate of retention of Dalhousie graduates in the region or a continued inflow from other areas, or both. The standard of one physician for 600 or 650 persons is usually quoted as a desirable goal although there is little evidence that it is adequate for a totally insured population. The Republic of Georgia in the U.S.S.R. has a ratio of one physician per 260,[5] and in the U.S.S.R. as a whole the number of physicians services per 1000 population is almost twice as high as in Canada today.[6] Few health planners in Canada suggest ratios of this order. The minister of National Health and Welfare of Canada has stated[7] "There is no evidence to suggest that the standard of health care is improved when the ratio (of population per physician) of one to 600-650 is exceeded". These are the levels recommended by the World Health Organization as a goal for developing nations. Their adequacy for Canada is open to question in view of the large increase in public demand for medical services since the introduction of Medical Services Insurance. For example, the Canadian Sickness Survey of 1951 showed that the population of the Maritime Provinces had 1567 physicians' services per 1000 population[8]. The Report of the Medical Services Commission of Nova Scotia shows that in 1971 the comparable figure was 3661, an increase of 133.6 percent. There was a 22.3 percent increase in population from 1951 to 1971. The increase in physician services was 163.3 percent, but the increase in the number of physicians was 85.5 percent. It is therefore suggested that careful consideration is required before the W.H.O. standard is accepted as a "ceiling".

Nevertheless it is of interest to determine how many physicians in clinical practice would be required to meet those ratios. In addition, Table XIII shows the number required to bring New Brunswick and Prince Edward Island to the same level as Nova Scotia, or to bring the three provinces to the 1973 ratio for all of Canada.

To achieve an increase in the physician manpower to meet any of these improved standards would require one or more of the following:

1. the retention of a larger number of Dalhousie graduates, or an enlargement of the class;
2. a larger number of Maritime Province graduates from Memorial University as classes are increased;
3. a substantial increase in the number of French-speaking physicians from Quebec universities;
4. the continued in-flow of some physicians trained in other countries.

There has been a substantial in-flow of foreign-trained physicians into the Maritime Provinces. This is not, as sometimes stated, a recent trend following the introduction of Medical Services Insurance in 1969. In the five-year period 1950-54, only 16 medical graduates of universities in other countries entered practice in Nova Scotia. A sharp increase to 109 in 1955-59 was followed by 132 in 1960-64 and then 244 in the 1965-69 period. Data are not available to show how many remained in the region, but the net gain was certainly less than these figures suggest. From 1966 to 1973 the net gain for the three Maritime Provinces was 274, as shown in Table XIV.

TABLE XIII

Physician Requirements in 1973 at Improved Population Per Physician Ratios

		No. of Physicians Required			
Province	1973 Level	N.S. Ratio	Can. Ratio	1/650	1/600
N.S.	910	910	991	1246	1350
N.B.	573	739	805	1012	1097
P.E.I.	100	130	142	178	193
Maritimes	1583	1779	1938	2436	2640
Increase from 1973		196	355	853	1057

TABLE XIV

Net increase in Physician Population of the Maritime Provinces 1966 to 1973 by Country of Origin or University

	No. of Physicians			Source						
Province	1966	1973	Increase	Dal.	Other Can.	U.K. Ireland	Other Euro-pean	India Paki-stan	Other Asian	Other
N.S.	833	1142	309	104	27	89	9	64	8	6
N.B.	525	643	118	46	—19	23	16	18	26	8
P.E.I.	90	105	15	5	5	6	-2	1	0	0
Maritimes	1448	1890	442	155	13	118	23	83	34	14

Source: Provincial Medical Registries.

The increase of 442 in six years, if continued for five more years to 1978, would bring the Maritimes to the 1973 Canadian ratio. but there would probably still be a problem of distribution with inter-provincial differences in the ratio. It would require a continued in-flow at the same rate for ten years to approximate a ratio of one clinical practitioner for 650 persons, taking into account population growth. Such an in-flow is extremely unlikely, however, in view of the recent restrictions on Canadian immigration and the changes in requirements for internship in University-sponsored programs.

In conclusion, the authors do not accept as proven the statement by Health and Welfare Canada that the supply of physicians is adequate and that only a problem of distribution remains to be solved. Nevertheless, it seems reasonable to improve the distribution by offering incentives to Canadian graduates to establish practices in under-doctored areas and to require a period of such service by would-be immigrant physicians. The suggestion, occasionally voiced, that Dalhousie will be graduating more doctors than can be absorbed into practice in the Maritimes is certainly not

substantiated by this study. On the contrary there should be active encouragement for them to remain in the region, especially New Brunswick and Prince Edward Island.

Acknowledgements

The authors express thanks to the Health Council of Nova Scotia for financial support, and to Miss Barbara Blauvelt, Office of the Dean of Medicine, for assistance in reviewing student and alumni records.

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U.S. Medicine's Foreign Accent

(1972 figures)

Type of M.D.	% who are FMGs*
All physicians	20.4
Direct patient care:	
Office practice	12.7
Intern/resident	35.8
Full-time hospital staff	55.2
Other activities:	
Medical teaching	21.7
Administration	12.6
Research	33.7
Other	21.4

*FMG (Foreign Medical Graduates) percentages do not include Canadians. Figures are for physicians not employed by the federal government. In 1972, 46 per cent of all newly licensed physicians were FMGs.

SOURCE: American Medical Association

Physicians Supply of Canadian graduates and immigrants

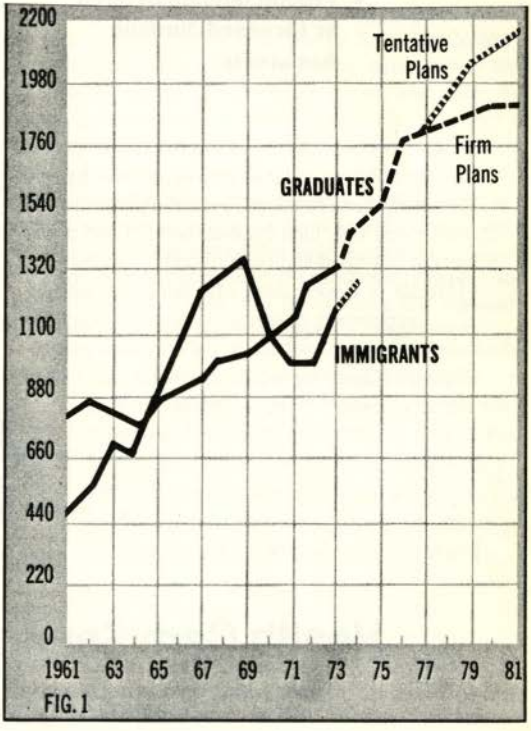

FIG. 1

SOURCE: Canadian Medical Association Journal.

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Yersinia Enterocolitica — Its Etiological Significance In Certain Human Acute Infectious Diseases

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Halifax, N. S.

Yersinia enterocolitica previously known as Pasteurella "X" has in recent years been demonstrated to be involved in certain intestinal infections, with sequelae.

The increased frequency in the numbers of isolations of Y enterocolitica emphasizes the necessity for clinicians (particularly pediatricians), bacteriologists and technologists, to become aware of the clinical features of the infection and the biological characteristics of the organism.

This organism has been isolated on a number of occasions from routine stool specimens sent to the Dept. of Microbiology — V.G.H. for routine examination. Two isolates were made from asymptomatic adults who were seeking employment in the baking and food catering trade.

This organism first came into prominence during the 1930's when an epizootic in California almost wiped out the chinchilla industry in that state. At that time it was recognized that the mode of spread was by contaminated food. For a number of years following this, it was thought that this organism was of only veterinary significance. However, in recent years, it has become widely recognized, as result of cumulative experience in the Scandinavian Counties,[1 2 3] and in particular Sweden,[4] that this organism is a pathogen which is capable of giving rise to human infection. Since the time when these earlier reports appeared in Scandinavian Literature, Yersinosis has been observed in many parts of the world.[5]

In 1949, Hässig, *et al.*[6] of Switzerland, isolated a gram negative bacillus from liver abscesses in a case of fatal septicemia. Other investigators[7] have described an acute abdominal malady with diarrhoea[8] as the major symptom and occasionally with vomiting. This condition may run a mild course or it may present itself as a severe enterocolitis with symptoms highly suggestive of dysentery. On occasion it may terminate fatally. A few cases exhibiting symptoms highly suggestive of acute appendicitis and an acute inflammation of the distal part of the ileum, with or without enlargements of the mesenteric lymph nodes, have been noted. Erythema nodosum is frequently associated with this infection.

Yersinia enterocolitica has been isolated from the cerebrospinal fluid,[9] blood, urine, eye swabbings and from the petechiae of patients showing symptoms of bacterial meningitis.

In a study made by Winblad, it was shown that the type of disease depends upon the age of the patient. Infants from the age of birth to about five years, characteristically develop diarrhoea and fever while older children usually develop acute lesions of the terminal ileum or acute mesenteric lymphadenitis resembling appendicitis (pseudo-appendicitis).

Adults may present with enteritis and fever. Arthritis is frequently presented. Solem and Lassen[10] described a case of Reiter's disease which followed Yersinia enterocolitica infection. A strong case is made out for the implication of this organism by the presentation of incriminating serological and bacteriological evidence.

Serological tests are available in which antibody titres against Yersinia enterocolitica may be studied. The development of agglutinins in the sera of patients with suspected Yersinia enterocolitica infection has been observed by a number of investigators. The observed serological findings have been used as a further strong argument for implicating this organism in pathogenic roles.

Members of the genus Yersinia (previously included in genus Pasteurella) are gram negative organisms possessing special biochemical features. They are now considered to be members of the family Enterobacteriaceae.

All routine stool specimens should be screened for Y enterocolitica especially those from young children. Characteristically, the organism grows well on S. S., MacConkey's and Desoxycholate media, producing small non-lactose fermenting colonies. The organism grows well within the temperature range 30°C — 37°C, however, some authorities believe that primary isolation may be more successful at 25°C[11,12] since at this temperature a greater proportion of other intestinal flora would be inhibited. Selenite, tetrathionate and tellurite broths may be used as enrichments. Since no absolutely ideal method has been worked out, classical methods used for the isolation of salmonellae, shigellae and enteropathogenic *E. coli* may fail to isolate this organism. Laboratory personnel should be aware of this organism.

One important biochemical feature of this organism is its ability to split urea promptly. Since this ability to split urea is used routinely as a preliminary step in the screening of non-pathogens from pathogens, it is possible for Yersinia enterocolitica to be discarded early in the bacteriological investigation as an inconsequential organism. This would be a very important point to bear in mind when screening food carriers and persons with no obvious clinical findings. A case has been described by Schieven[13] which underscores the importance of careful examination. A seven-months-old child presented with a persistent diarrhoea. Three consecutive cultures were examined and on each occasion enteropathogenic E. coli type 0128:B12 was isolated. This organism was sensitive to ampicillin. At this point the patient was treated with ampicillin but no substantial improvement was noted.

Some days later, it was confirmed that the original stool culture also grew Y enterocolitica which was sensitive to

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triple sulphonamides but resistant to ampicillin. Ampicillin was discontinued and triple sulphonamide substituted. At this stage serology showed an antibody titre of 1:320. Following institution of sulphonamide therapy, the child made rapid recovery. A second antibody titre done two months later, showed a fall to 1:80.

In future this organism may have to be considered from a public health standpoint and policies laid down dealing with the carriage of this organism among asymptomatic food handlers.

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CORRECTION AND APOLOGY

Please note the following correction in Dr. Ralph Phillips' article *"Hypnosis in General Practice, Obstetrics and Dentistry"* which ran in our April, 1975 Issue.

Paragraph under the Dangers of Hypnosis, fifth line should read ... "of depressed patients" and not "regressed patients."

Our apology to Dr. Phillips.

Phenylketonuria: A Preventable Tragedy

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Approximately one of every 14,000 children born in Nova Scotia has phenylketonuria (PKU). If treatment is not instituted, characteristically severe irreversible mental retardation develops in the first few months of life; but fortunately, if appropriate therapy is begun early, mental retardation is completely preventable. Early diagnosis is essential, however, for a delay of even a few weeks results in irreparable brain damage.

Recognition of the value of early diagnosis and treatment in the prevention of mental retardation in children with PKU has stimulated the development of government-supported screening programs throughout much of the western world to detect the cause of PKU — hyperphenylalaninemia — in neonates. As a result, hundreds of children who otherwise would have been institutionalized are leading productive lives.

Nova Scotia has provided the facilities for PKU testing of every infant born in the province. A recent survey has shown, however, that as many as 700 babies per year are not being screened, and it has become apparent that most physicians have abandoned routine testing for phenylketones in urine from apparently well babies. Hence, if a child who slipped through the newborn screening program were to have PKU, his condition is unlikely to be discovered until he exhibits signs of mental retardation — by which time the brain is irreversibly damaged.

In Nova Scotia, when an infant is four to five days old, or has been on milk feedings for at least two days, a small quantity of blood should be obtained from a heel-prick, applied to a special blotter with a requisition attached, and sent to the Department of Biochemistry at the Izaak Walton Killam Hospital for Children in Halifax. It is important to have the infants on milk feedings before testing, because phenylalanine does not accumulate in the blood until those with PKU are subjected to phenylalanine loading, in the form of a high protein intake. The chances of missing a child with PKU who is tested after three days on milk feedings are negligible.

Hyperphenylalaninemia (serum phenylalanine over 4 mg per 100 ml) in the newborn period does not necessarily mean that the infant has classically described PKU: there are at least six variants of the disease. Most physicians are familiar with classical PKU, characterized by high serum phenylalanine levels, the excretion of phenylketones in the urine, and progressive mental retardation. The tolerance of dietary phenylalanine in these children is characteristically low (less than 500 mg per day), and their serum phenylalanine levels are typically very high (30-60 mg per 100 ml) on a normal diet. Prevention of mental retardation in these children requires strict control of their phenylalanine intake.

Another (small) group of children with PKU differ from those with the classical form of the disease by their ability to tolerate a much higher phenylalanine intake (500-2000 mg per day). In these children, also, mental retardation can be prevented by giving a diet restricted in phenylalanine, but not as restricted as for classical PKU.

A third group of children have all the features of classical PKU (high serum phenylalanine levels; low phenylalanine tolerance), but with time their tolerance increases. These children should be kept on a low-phenylalanine diet as long as the tolerance is subnormal, a situation that may persist for three to four years.

A fourth group of children, in some geographic areas equalling the number of children born with classical PKU, have persistent but mild hyperphenylalaninemia (less than 15 mg per 100 ml). Unlike the other groups described, these children do not excrete phenylketones in their urine (Phenistix or ferric-chloride testing is negative) and do not become mentally retarded. No dietary treatment is necessary for this benign hyperphenylalaninemia.

In a fifth group of neonates (approximately two, usually premature, per 1000 births), transient low-level hyperphenylalaninemia develops when they are placed on a cows' milk formula. However, the levels of tyrosine also are elevated (in contrast to babies with PKU, in whom tyrosine levels are typically low). This condition is transient and benign. Switching the baby to human milk, which contains less protein than cows' milk, will 'cure' their hyperphenylalaninemia. Specific phenylalanine restriction is not indicated — indeed, it may be harmful.

Special mention should be made of a sixth group of infants, who may have hyperphenylalaninemia of the newborn; these are the infants of phenylketonuric mothers. In classical PKU, because the mother metabolizes phenylalanine for the fetus, the infant's toxic levels of the amino acid develop only after birth. But the fetus of the mother with PKU, is exposed to a high-phenylalanine environment from the time of conception, and in virtually every case has microcephaly and other congenital malformations even if he does not have PKU. Phenylalanine levels in the cord blood are elevated, but unless the infant has PKU his own serum levels return to

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normal within one to three days. This group of children does not benefit from phenylalanine restriction after birth — the damage is already done.

The value of phenylalanine restriction during pregnancy in the prevention of this tragedy is as yet unproved. At the present time, therefore, women with PKU should be strongly advised to obtain expert genetic counseling before bearing children. In addition, any woman who bears a child with microcephaly of obscure etiology, or has two or more children with nonspecific mental retardation, should be tested to determine whether she has phenylketonuria.

To ensure that each child with hyperphenylalaninemia receives the appropriate treatment, the accurate diagnosis of PKU or one of its variants is essential. Before initiation of treatment, confirmation of persistent hyperphenylalaninemia (over 15 mg per 100 ml) with normal or reduced serum tyrosine levels is required to establish the diagnosis of PKU. Phenylalanine restriction is begun to reduce the serum level to about 4 mg per 100 ml, and then a loading test should be conducted to establish the baby's phenylalanine tolerance. Since phenylketones may not be excreted until the child is three to six weeks old, the absence of these metabolites is of little diagnostic significance in the newborn period.

At age three to four years all children with PKU should be challenged with a carefully controlled high-phenylalanine intake (a phenylalanine loading test) to determine whether their phenylalanine tolerance has changed. If it has not, the child should be returned to a low-phenylalanine diet. If, on the other hand, their tolerance has returned to normal — as occurs in a few cases — the diet can be safely discontinued. Quantitative serum and urine amino-acid analyses are conducted at the Izaak Walton Killam Hospital; the laboratory also assists in the continuing management of many children with PKU in the Maritimes.

The treatment of PKU rests to a large extent on the provision of a diet containing sufficient phenylalanine to prevent its deficiency but sufficiently restricted to prevent the accumulation of toxic amounts (15 mg per 100 ml or over). Careful monitoring is mandatory. Maintenance of the phenylalanine level between 4 and 10 mg per 100 ml appears best for optimal development of the affected child. Experience has shown that reducing these levels to less than 3 mg per 100 ml in children with PKU almost always produces signs of phenylalanine deficiency: lethargy, apathy, rash, and mental deficiency.

Provision of the restricted diet has been simplified by the development of a low-phenylalanine milk substitute, Lofenalac (Mead Johnson). By the judicious use of this and other low-phenylalanine products, along with careful manipulation of other dietary sources of protein and frequent monitoring of serum phenylalanine levels, the child with PKU can grow up to be indistinguishable from his peers in terms of intellect and physical development.

How long should the diet be continued? The most critical period in the prevention of mental retardation in children with PKU is the first two years of life. The fact that discontinuing the diet in school-age children is usually not associated with obvious impairment of intelligence has led some to suggest that it can be safely stopped at age five or six years. Most authorities recommend that phenylalanine restriction should be continued as long as possible. For instance, it has been observed that behavior disorders develop in many children with PKU when the diet is stopped and that these are improved by re-instituting phenylalanine restriction. Even severely retarded children with PKU may become less irritable and less hyperactive on a low-phenylalanine diet.

Heredity and Genetic Counselling

What is the risk for a couple with an affected child having another similarly affected? PKU is a hereditary disease transmitted as an autosomal recessive condition. The carriers (as many as one of every 50 persons) are completely normal clinically; when two carriers marry, however, they have a 25% chance of bearing a child with PKU. The risk is the same for each pregnancy; hence, if a couple has a child with PKU, the chance that the next one will have the disease is still one in four. By virtue of the same random reassortment of genes, the chances are 50% that any one of their children will be a carrier and 25% that any particular child will be completely normal.

The unaffected children of carrier parents should be tested to determine whether they are carriers. When known carriers are planning to marry, their prospective spouses also should be tested for the carrier state: if both are positive, they should be advised of the 25% risk that they will have a child with PKU. The most reliable method to detect carriers of PKU is a carefully controlled phenylalanine loading test. At present, PKU cannot be diagnosed prenatally.

Biochemical Genetics Clinic

Recognizing the importance of accurate diagnosis and careful dietary management of children with PKU and other genetic metabolic diseases, the Department of Pediatrics at the Izaak Walton Killam Hospital for Children, in collaboration with the staff and facilities of the Atlantic Research Centre for Mental Retardation, has established a Biochemical Genetics Clinic. In addition to providing diagnostic services and advice concerning the management of these complex genetic metabolic diseases, the Clinic maintains close communication with other North American centers dealing with similar problems. Hence recent advances in the understanding of genetic metabolic disease are passed on to the patient with a minimum of delay.

Appointments and consultations are arranged through the Clinic Coordinator, Miss D. d'Entremont, Atlantic Research Centre for Mental Retardation (424-3340; collect calls will be accepted from Maritime physicians).

Summary

Mental retardation due to phenylketonuria is completely preventable by long-term dietary phenylalanine restriction. The Nova Scotia screening program to detect hyperphenylalaninemia in the neonate is a reliable method to

identify infants who might have PKU. More discriminatory diagnostic procedures are required, however, to rule out benign variants of the disease and to ensure that appropriate therapy is prescribed. The serum phenylalanine levels of children on restricted diets should be determined frequently to prevent deficiencies or toxic accumulations of the amino acid. PKU is a hereditary disease; the chance it will recur in a family with an affected child is 25%. □

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ST. JOSEPH'S CHILDREN'S CENTRE

A day treatment program, in operation since January 1972 is operating at St. Joseph's Children's Centre, Halifax, Nova Scotia. The program runs Monday through Friday from 8 a.m. to 5 p.m., twelve months of the year.

The unit is designed to help exceptional children learn appropriate and acceptable behavior. A child is considered exceptional if his or her behavior is such that he/she cannot be managed in a regular pre-school or nursery unit or in his/her home.

Children are referred to the day treatment program from units within St. Joseph's, other day care centres and nursery programs, physicians and a number of social agencies such as the Department of Health, Department of Social Services, Hearing and Speech Clinic and Children's Aid Society. A child may be referred either for treatment or for a more concrete assessment of his/her problem behavior.

The unit co-ordinator makes a home-visit after the referral is received and if a child is an appropriate candidate, intake procedures begin. On-going communication regarding the child's status is maintained with all agencies actively involved.

The following types of children would be considered for admission: those with acting out behaviors, exhibited by anti-social and/or violent behavior towards children, adults or toward himself or objects; those with withdrawing behaviors or an unwillingness to interact with peers or adults; culturally and socially deprived children; children who do not communicate verbally due perhaps to brain damage affecting speech and language development, a moderate hearing loss or because the child has elected to be mute; mild retardation where the referral source and the unit admissions committee agree that a diagnosis of retardation is in question; and hyperactive children whose difficulties have an organic or a non-organic base. All admissions, transfers and discharges of children require approval by the unit's Advisory Committee.

The primary aspects of the program provide for activities that will contribute to the social, physical, mental and emotional growth and development of children. The initial program for each child is designed on his/her performance on the Memphis Comprehensive Developmental Scale and on teacher observations as recorded on the initial assessment report. Programs are designed both to enhance developmental strengths and to remediate developmental deficits. Parent involvement is an important part of the treatment program and is considered essential if a significant change is to occur in the child's behavior. Inter-agency co-operation and back-up resources are available to the program in the form of a voluntary advisory committee which meets monthly.

The unit maintains a 1:3 staff-child ratio plus the unit co-ordinator and a part-time social worker. This ratio allows for the individual needs of each child to be met. All unit staff have had training and experience working with exceptional children.

A vital role played by the day treatment program is that it acts as a preventative service to help pre-schoolers overcome their difficulties before they become a part of their basic personality. By such a program being available to deal with the behavioral and emotional difficulties of a child at the pre-school level, there is less chance that the problems will multiply at a later age.

If any additional information is required regarding referrals or the unit program, please contact the unit co-ordinator, Mrs. Sue McRuer at 2326 Brunswick St., Halifax, N.S., Telephone: 422-8441 □

Ultrasound — A Diagnostic Tool

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The principle of ultrasound was first developed in the 1800's, but it was not until the sinking of the Titanic that research in this area became prominent. The first medical examination was not done until 1947. This was an examination of the head for localization of the midline and was followed closely by examination of the heart and abdomen. It was, however, not until the late 1960's that technology was able to supply the present complicated electronics which took the patient out of the water bath and allowed contact scanning. In 1966, Dr. Ross E. Brown of Winnipeg became the first full time ultrasound physician in North America. This diagnostic modality is a sound wave of 2.25 MHz, although in certain instances up to 20 MHz is used. The sound wave is produced when a piezo-electric crystal of lead zerconate titanate is struck with electrons. The electrical energy is thus converted into mechanical energy. This crystal is coupled to the surface of the body with mineral oil or olive oil. The sound wave is transmitted into the body and is reflected back at interfaces of tissues of different acoustical impedances. The returning waves strike the transducer crystal and are converted into mechanical energy, amplified and displayed on a cathode ray tube (CRT). This tube may then be photographed for a permanent record, or a strip chart recorder may be coupled to the tube for collecting physiological as well as anatomical data.

The methods of display on the CRT are "A", "B" and "M" modes. "A" mode refers to amplitude modulation and is seen as a spike on the CRT. The stronger the returning echo, the higher the spike will be. If the "A" mode is rotated through 90°, one sees the "top of the spike" as a dot recorded on the CRT. The brighter the dot, the stronger the returning echo. This is "B" mode, or brightness modulation. If "B" mode is then set in motion to sweep across the screen, one has "M" or motion mode.

Applications

Most organ systems of the body can be examined with ultrasound except for the skeletal system and lung. Some work, however, has been done within the thorax, particularly pertaining to pleural effusions and pulmonary emboli. Localization of organs and aspiration biopsies[1] are most readily done under direct vision, and anatomical relationships for radiotherapy planning are readily done.

Head

In the examination of the head, one can measure the position of the midline pineal gland and third ventricle to determine any degree of shift. This is most useful in cases of suspected subdural hematoma or other expanding supratentorial lesion. Measurement of the lateral ventricles is useful in hydrocephalus and determining patency of ventricular shunts.

Eye

Identification of detached retinas, foreign bodies, vitreous hemorrhage, intra and extraocular tumors may all be detected. This is particularly useful in the presence of lens opacities.

Thyroid

Differentiation of solid from cystic lesions and determining gland volume are the main uses.

Chest

Pleural effusions, mediastinal tumor localization and ascending arch aneurysms may be visualized.

Heart

Mitral and aortic valves have been well documented as to area, speed of motion and configuration. Chamber volumes may be determined, and stroke volume and cardiac output calculated with acceptable accuracy. This is the diagnostic tool of choice in the diagnosis of pericardial effusion, atrial myxomas and asymmetric septal hypertrophy. The post-operative follow up of mitral commissurotomy is extremely valuable as is the finding of the "floppy mitral valve".

Abdomen

The size and consistency of the intra-abdominal organs,[3] including lymph nodes, bladder, prostate and uterus, may be determined.[4] The retroperitoneal space can be examined for neoplasm, hematoma or abscess, and it is most valuable in abdominal trauma to detect ruptured solid viscus, free fluids or retroperitoneal hemorrhage (Fig. 1). It can differentiate solid from cystic masses in any organ, and can follow the progress and indicate the efficiency of chemotherapeutic agents on enlarged lymph nodes or intra-abdominal neoplasms (Fig. 2). It is extremely useful in the differentiation of jaundice by identifying a distended gall bladder,[4] intrahepatic biliary radicals, common bile duct and can identify stones within these latter structures. It is also a highly accurate tool in the diagnosis of pancreatic disease (Fig. 3) and recent work has been done in aspiration biopsies of the pancreas where over 200 cases have been reported with an over 80 percent diagnostic accuracy.

In the field of obstetrics and gynaecology, this has become an absolutely essential tool. It is the tool of choice in the diagnosis of placenta previa, abruptio placenta, multiple gestation, hydatidiform mole, and more recently congenital anomalies such as anencephaly.

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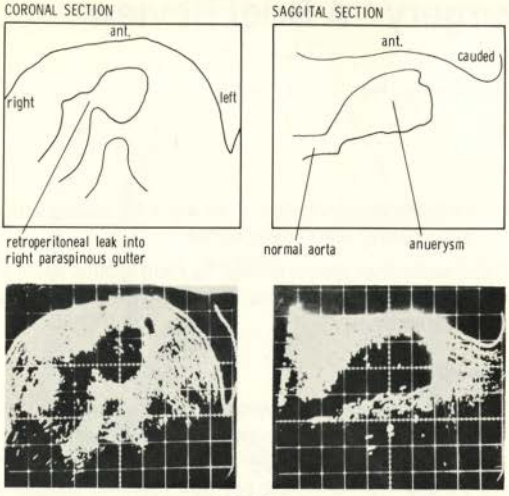
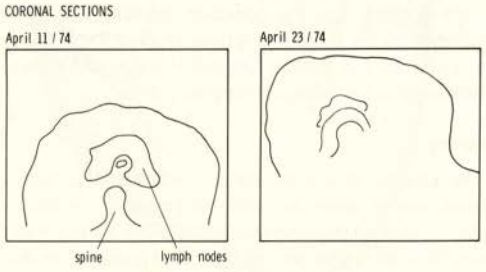


FIGURE 1

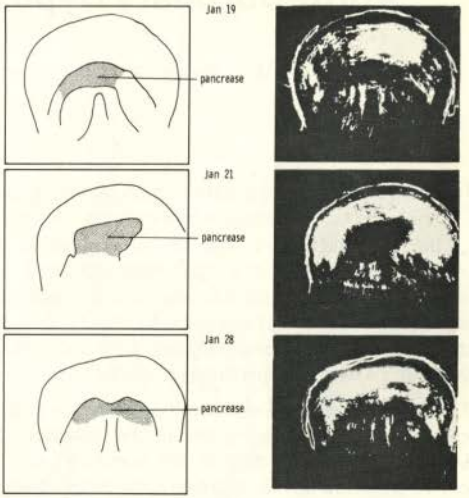


HODGKINS DISEASE PRE AND POST CHEMOTHERAPY

FIGURE 2

Echobiology

Much work has been done in this field.[5] We are using power ranges of 2 to 3 miliwatts; and through experimental work on most types of body tissues, it has been determined that five watts of power are required to produce tissue damage. The ultrasound equipment used at the Victoria General Hospital has an output of 90 volts, and this is pulsed at 500 to 1500 times per second with each burst of energy being two microseconds long so that the transducer is actually listening 95 percent of the time. With this power rating, it has been determined that the transducer must remain in place on the patient for a period of two years in order to produce tissue damage.



CHRONIC PANCREATITIS WITH EXCASERBATION AND REMISSION

FIGURE 3

Education

To master the art of performing an ultrasound procedure requires months of practice and an expert knowledge of anatomy. At present, we have trained one technologist who can perform most of these procedures. The interpretation of the data is also difficult and requires months of experience. The field is a rapidly changing one, with new information being produced daily. There is a great future in this diagnostic modality, mainly because of its non-invasiveness, ease of application and re-applicability. Its accuracy has yet to be proven to many in this province, but those who presently include it in their diagnostic armamentarium and are selective in their cases, find it highly reliable. There is a research lab doing echocardiography under the direction of Dr. Eldon Smith with results comparable to most of the better labs in North America. The diagnostic X-Ray Department at the V.G. is carrying the main service load of the hospital, and there is a similar department at the Grace Maternity Hospital. Equipment was contemplated for the Halifax Infirmary; however, the Hospital Commission did not see fit to supply it. Within the next two to three years, most of the major diagnostic centres in this province will require this equipment, and there will have to be a rather large training program embarked upon for personnel to operate it. There is one great stumbling block in the further development of this field in that it requires the full time direction of a physician; but under the present system of remuneration, it is not financially possible for a physician to make his living in this field. This problem may be resolved in the next few months as negotiations are continuing with our provincial Government.

□

References on page 103.

Aorto-Coronary Bypass Surgery: A Brief Review

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The initial aorto-coronary bypass surgical procedure using the saphenous vein was probably carried out by Favaloro et al[1] at the Cleveland Clinic in May, 1967. The operation now represents over one-half[2] of all open heart operations, and there were over 20,000 of these operations performed[3] in the United States in 1972. This procedure has been used at the Victoria General Hospital since January, 1971 and a total of 122 operations have been performed since that time.

This paper represents a review of the literature in order to ascertain: the current feeling toward the operation; the assessment techniques used in the operation; and the operative and follow-up results to date at the Victoria General Hospital.

The Operation

This operation is designed to bypass significant atherosclerotic stenotic lesions (75 per cent narrowing) of major coronary arteries. The aorto-coronary bypass graft procedure involves suturing a short segment of the patient's saphenous vein as a conduit between the aorta, and to one or more of the three main obstructed coronary arteries (right, anterior descending, and circumflex). Figures 1 and 2 indicate typical positions of the saphenous vein grafts.

Patient Selection

Severe angina which is not relieved by optimum medical treatment is an indication for coronary arteriography and possible coronary artery surgery. The simplicity and safety of coronary angiography allows the physician to assess with some measure of accuracy the location and degree of coronary artery stenosis. A reduction of greater than 75-80% in lumen diameter is considered significant enough to impair coronary flow. A coronary vessel such as this with localized lesion, supplying viable myocardial muscle, and with a good distal run off, is considered suitable for coronary artery bypass surgery.[3] The New York Heart Association gives the following criteria[4] for the diagnosis of atherosclerosis of the coronary arteries.

1. Anginal syndrome in the absence of aortic valve obstruction or coronary ostial stenosis.
2. Evidence of myocardial infarction in the absence of evidence of coronary emboli.
3. Evidence by coronary arteriography of the vascular abnormalities described.
4. Evidence of calcification of an artery by radio-graphic techniques or at the time of surgery.

This classification system is used by many groups and if a patient is in class 3 or 4 of this classification, he is usually a candidate for surgery.[5]

Operative Mortality

Table I represents statistics on operative mortality as reported by various groups in the United States and Canada. The results for the Victoria General Hospital are included in this list and indicate an 8.2 per cent operative and early post-operative mortality rate. The average mortality rate for ten surgical teams, excluding Karnegis,[7] is 6.8%. Hammond et al[11] suggest that the operative mortality rate is not dependent on the number of arteries grafted. Table II gives the results for the Victoria General Hospital and shows a similar trend to the findings of Hammond et al.

Patency

The patency of a graft refers to whether it is open or closed, and is assessed using angiographic techniques. Patency rates for the saphenous vein grafts are reported as being 70 — 80% after one year. Table III gives the results of patency studies for one year following surgery. The most important indicator of graft patency is blood flow rate through the graft after the patient is taken off the heart-lung machine. Occasionally the internal mammary artery is freed from its bed and sewn to the diseased coronary artery, but in most cases, the saphenous vein is preferred for the operation because its larger calibre permits a greater flow to pass

TABLE I

Operative Mortality for the Aorto-coronary Bypass Graft Operation.

Surgical Team	Number of Patients	Operative Deaths*	Per Cent Mortality
Adam et al[8]	350	34	9.7
Cannom et al[5]	400	25	6.2
Effler et al[26]	224	10	4.5
Green[9]	165	12	7.2
Grondin et al[10]	500	36	7.2
Hammond et al[11]	100	9	9.0
Karnegis[7]	55	11	20.0
Kouchoukos et al[6]	548	19	3.5
Reul et al[12]	1287	82	6.4
V.G.H.	122	10	8.2
Zubiati et al[13]	477	21	4.4
		Average	6.8

*Generally refers to death at time of operation, or within the 10 day post-operative period.

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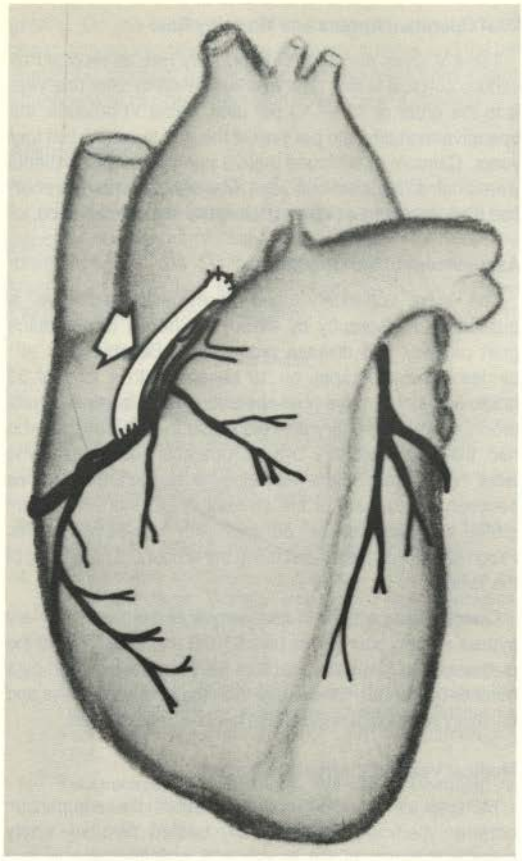
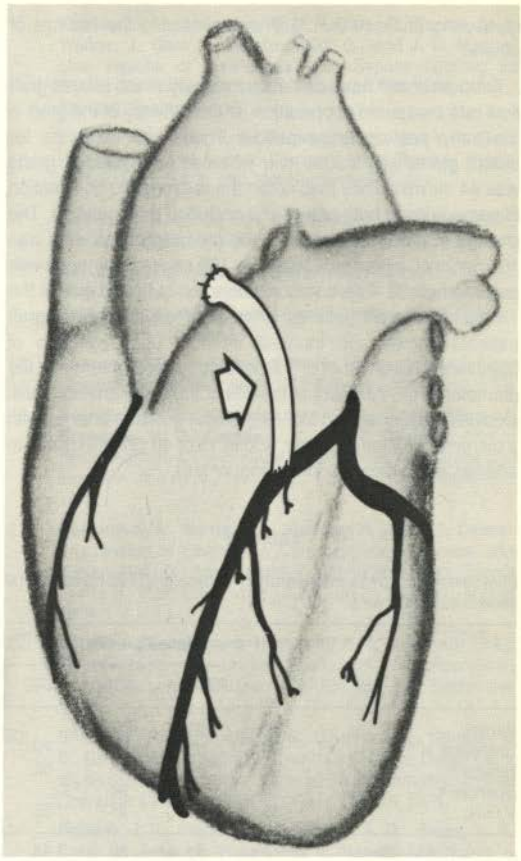


Aorto-coronary Bypass Graft to Right Coronary

FIGURE 1



Aorto-coronary Bypass Graft to Left Coronary

FIGURE 2

through it to the coronary vasculature. The internal mammary is used by some surgical teams because they feel that the higher velocity of the blood flow through the smaller calibre mammary artery lessens the possibility of thrombus formation. Furuse et al[16] have shown that a graft to artery ratio of 1.5 seems to be optimum for both having a high flow and a sufficient velocity to prevent thrombosis. Some authors claim that the flow rate through a saphenous vein graft as measured during the operation, should be greater than 40 ml/min in order to insure patency. However, as indicated from the work of Grondin et al[14], the flow should be greater than 55 ml/min. Table IV indicates the results of measurements of the average flow rates through bypass grafts reported by four other surgical teams as well as the results from the V.G.H. The average flow rates which we are

TABLE II

Operative Mortality Rate with respect to number of grafts inserted per patient at V.G.H.

No. of Grafts*	No. of Patients	Operative Deaths	Operative Mortality Rate (Per Cent)
Single	60	5	8.3
Double	57	4	7.0
Triple	5	1	20.0
Total	122	10	8.2

*A total of 184 grafts were inserted.

TABLE III

Patency of Grafts post-operatively.

Surgical Team	No. of Grafts	Patient Grafts	Per Cent Patency
Karnegis[7]	52	37	71**
Hammond et al[11]	83	67	81**
Grondin et al[14]	157	139	88*
Flemma et al[15]	675	550	81**
Green[9]	152	106	70**
		Average	76***

*Early post-operative period
**One year post-operative
***Average of patency after one year.

measuring at the V.G.H. are very similar to the findings of others.

Grondin et al[14] have carried out a study which relates graft flow rate measured at operation, to the patency of the graft in the early post-operative period. This mean flow rate for patent grafts was 75 ml/min, whereas for occluded grafts was 44 ml/min. They also noted the response to an injection of papaverine in both patent and occluded graft patients. The change in mean flow rate for the patent graft patients was 130 per cent, whereas, it was only 105 per cent for those with occluded grafts. There was no increase in flow in five of the 18 occluded graft patients whereas all of the patent graft patients showed an increase in flow upon injection of papaverine. Grondin et al[20] have also related patency to the diameter of the coronary at the site of the distal anastomosis. Occlusion occurred in 15 of 81 (18.5%) grafts to arteries with a diameter of 2 mm or more, and in 15 of 40 (37.5%) grafts to arteries with a diameter of 1.5 mm or less.

TABLE IV

Flow rates in the three main coronary bypass grafts as measured by various surgical teams.

		Mean Flow (ML/MIN)		
		RT. Cor.	ADA	CIRC
Barner[17]	398	61	57	
Grondin et al[14]	96	59	61	79
Najami[18]	50	77	70	58
Spencer[19]	24		84	
V.G.H.	35	90	71	55
	Averages	72	69	64

TABLE V

Postoperative Mortality Rates for the Aorta-coronary Bypass Graft Operation.

Surgical Team	No. of Patients	Post-Operative Period (Months)	Per Cent Mortality
Adam et al[8]	350	2-43	3.2
Cannom et al[5]	400	2-40	14.2
Hammond et al[11]	100	12	3.0
V.G.H.	104*	10 days-40 mos.	5.8

*18 patients, operated on prior to November, 1973, never returned for follow-up.

TABLE VI

Operative mortality rates per year at the V.G.H.

Year	1971	1972	1973	1974
Mortality Rate	8.3%	11.0%	7.0%	6.5%

Post Operative Angina and Mortality Rate

Table V gives the long term mortality rate as reported by various surgical teams. The average mortality after one year is in the order of 12 — 13 per cent. Table VI presents the operative mortality rate per year at the V.G.H. for the last four years. Cannom et al[5] found that 79 per cent of their patients were angina free after one year, whereas Kouchoukas et al[6] had 63% angina free patients during the same time period.

Assessment of the Operation

The most commonly used assessment technique is qualitative angiography by which one hopes to determine graft patency and disease progression. Benchimol et al[21] carried out angiography on 19 patients with a total of 33 grafts and at 102 days post-operation. They found a natural progression of coronary artery disease in both patients who had the aorto-coronary bypass operation and those who were not grafted. There was also no significant difference between progression of the disease in patients with patent grafts as compared to patients with non-patent grafts. Progression was measured using the amount of narrowing of the lumen.

Quantitative methods of assessment of the aorto-coronary bypass surgery such as the use of VCG and ECG[5 22], and the measurement of ejection fraction[13 18 22], are being used by a number of groups. However, at this stage the usefulness and reliability of these methods have not been established.

Medical Versus Surgical Treatment

McNeer et al[24] report on a study of the comparison between medically and surgically treated coronary artery disease patients. In the report, 402 patients were treated medically and 379 treated surgically by bypass graft procedure. Two years later, more than twice as many surgically treated patients were pain free as compared to the number of medically treated patients who were pain free. Eighty-five per cent of the surgically treated patients were alive after two years, and 83 per cent of the medically treated patients were alive after that period. Cannom et al[5] compared their study of 400 patients with the Framingham study as well as to a study of patients who were medically treated and reported by Oberman[25]. Cannom's patients showed an improved survival over the Oberman group at 16 months, and over the Framingham study at 30 months.

Conclusion

The mortality results of aorto-coronary bypass surgery at the Victoria General Hospital are well within the average of rates being reported in other large centers. The operation appears to be a better alternative than medical treatment for patients in Class 3 and above of the New York Heart Association classification. Clearly, the most important indicator of patency is blood flow rate which should be above 55 ml/min for all three main coronary artery grafts.

It is recommended that patients suffering from angina which is either increasing in frequency or is refractive to pharmacological therapy be considered for coronary angio-

graphy. On this basis, a decision for surgery can be made depending on the nature of the coronary arteries and the left ventricular function. In surgery cases the relief from angina after one year can be expected in 85 per cent of patients.

Acknowledgements

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The Third Molar (Wisdom Tooth)

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The third molar tooth is the last tooth to erupt in each quadrant of the dental arch. This occurs at the average age of nineteen years. In the Canadian Eskimo and other cultures which generally eat a more fibrous diet it is not unusual to have a fourth molar in human jaws.

PROBLEMS ARISING WITH THIRD MOLARS

1. Crowding

This is the most common pathologic problem. It is occuring with increasing frequency and thought to be due to two factors: a) decreasing jaw size due to a more highly refined diet and b) decreased anterior tooth loss from the use of improved dental preventative measures.

Crowding may result in the third molar preventing the eruption of second molars or more frequently the third molar itself becoming lodged between the second molar and the anterior border of the mandibular ramus. (Figure 1)

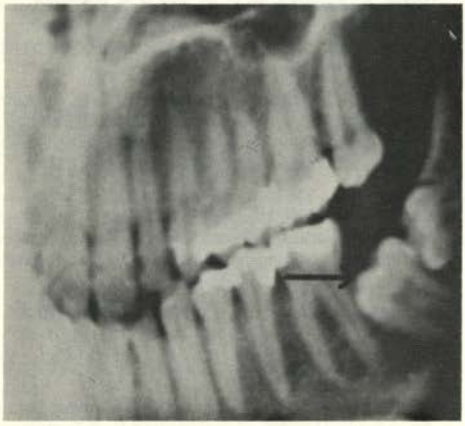

FIGURE 1

2. Infection

Infection about the crown of an erupting third molar is referred to as paracoronitis and is caused by the entrapment of food and oral organisms under a mucosal flap which covers the partially erupted tooth. This can be a chronic low grade infection or more acute with extension of purulent exudate into the fascial spaces of the masticating muscles causing them to go into spasm producing trismus. There will generally be cervical regional lymphadenopathy and the usual systemic manifestations of an acute infection. Treatment involves irrigation, antibiotic therapy, generally penicillin as the organism is usually a gram positive staphylococcus and normal mixed oral flora, and occasionally drainage. Following recovery from the acute phase the tooth should be removed. (Figure 2)

Periodontal infection may occur at the distal end of a second molar as the result of a malposed third molar. If the third molar is not removed at the appropriate time, this may lead to the loss of both the second and third molars. (Figure 3)

FIGURE 2

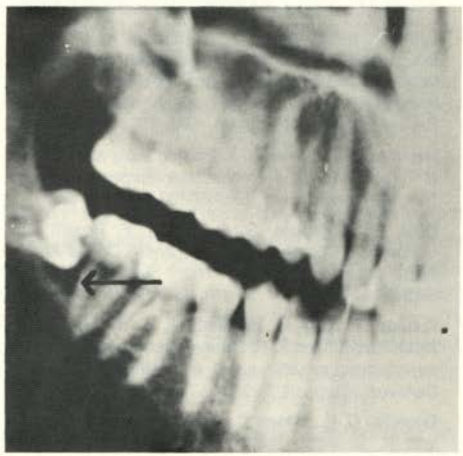

FIGURE 3

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3. Cysts

The unerupted third molar is surrounded by a follicle containing squamous or columnar epithelium resembling the reduced enamel epithelium which formed the enamel of the tooth. This follicle may expand, surround the crown of the tooth and during its expansion displace the tooth cranially in the ramus of the mandible, or if in the maxilla, into the maxillary sinus or orbitally.

If dentigerous cysts occur multiply they may be a manifestation of the basal cell naevus syndrome and the patient should be investigated for the other manifestations of this syndrome.

Dentigerous cysts should be removed and preferably before they encroach upon adjacent anatomical structures. Those that are reported as keratocysts should be followed since the incidence of recurrence is greatly increased. (Figure 4)

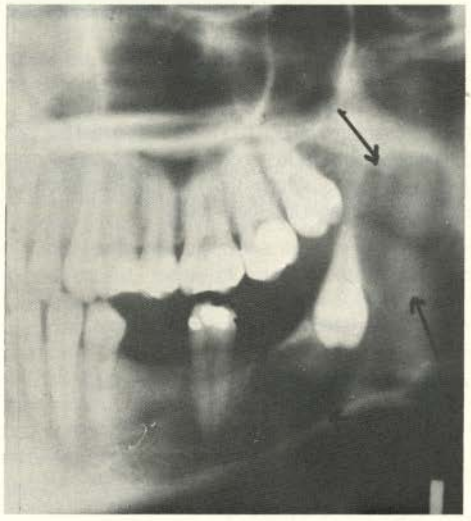

FIGURE 4

4. Benign Neoplasms

These lesions form from the reduced enamel epithelium or the dental papilla (pulp precursor). Those that form from enamel epithelium produce the ameloblastoma (adamantinoma) of jaws. These lesions are benign in that they do not metastasize. They do, however, tend to recur locally. They should be removed in their entirety. Since they occur frequently in the young adolescent the treatment of choice is to excise the lesion and a reasonable amount of surrounding bone. This will be curative for 90% of cases. For those that recur, a more aggressive approach is required and occasionally a section of mandible is removed, including the inferior border.

The neoplasm arising from the dental papilla is the odontogenic myxoma. Unlike myxomas in long bones this is a much less aggressive lesion and local excision successfully treats the lesion.

The odontoma may have many morphological varieties and is composed of all tooth elements. These are successfully treated by local excision.

5. Malignant Neoplasms

The unerupted third molar may give rise to a squamous cell carcinoma. The etiological mechanism of this lesion when it occurs within bone is from a malignant change of the squamous follicle surrounding the tooth. Follicles that are removed with an unerupted third molar tooth should generally be submitted for histopathological evaluation. (Figure 5)

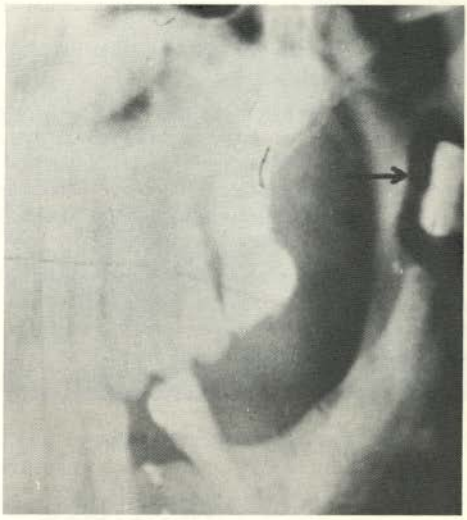

FIGURE 5

FIGURE 6

A malposed third molar which chronically irritates the buccal mucosa during jaw function may produce tissue changes resulting in a squamous cell carcinoma of the buccal mucosa. (Figure 6)

6. Occlusal Interference

The overerupted third molar, during tooth occlusion, may interfere with a tooth of the opposing jaw. This may produce a forced gliding motion on jaw closure and, depending on the direction, produce pain in the ipsilateral or contralateral temperomandibular joint and its surrounding musculature. (Figure 7)

SUMMARY

The six more common problems associated with the third molar have been reviewed.

It is estimated that with man's decreasing jaw size and decreased tooth loss from improved preventative measures that at present 65% of the population will at one time or another require removal of their third molars. With problems occuring in such a high percentage one must consider the optimum age for their removal.

For optimum osseous repair of the surgical defect which occurs at the distal end of the second molars and for optimum systemic health of the patient the best age for removal of the third molars is 18 — 24 years.

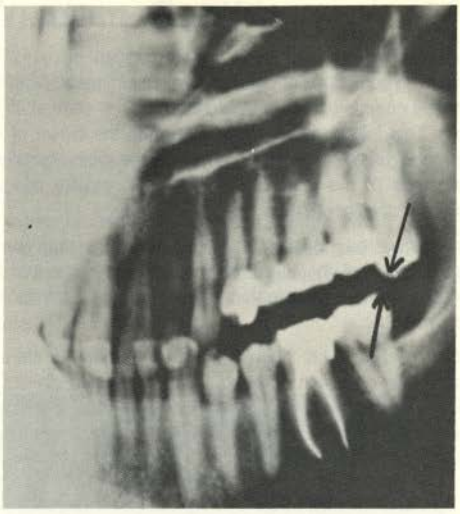

FIGURE 7

Prior to their removal one has to be certain that the tooth is not in some way useful to the dental arch because of missing anterior teeth or as a donor tooth for transplantation to the site of an unrepairable first molar tooth. □

Physician Self - Assessment

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The following questions have been submitted by the Division of Continuing Medical Education, Dalhousie University, and are reprinted from The American College of Physicians **Medical Knowledge Self-Assessment Test No. 1** with the permission of Dr. E. C. Rosenow, Executive Vice-President.

It is our hope that stimulated by these small samplings of self-assessment presented you will wish to purchase a full programme.

DIRECTIONS: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the ONE that is BEST in each case.

18. In a patient with pneumococcal pneumonia, physical examination of the chest on the involved side is likely to show all of the following EXCEPT

    (a) dullness to percussion
    (b) rales
    (c) decreased excursion
    (d) vesicular breath sounds
    (e) increased tactile fremitus □

(Please turn to page 103 for answers)

Elective In Colombia

Patti Pearce,*
Halifax, N. S.

During the fourth year elective this summer, I worked in a pediatric hospital in Bogota, the capital of Colombia. Bogota is a city of two million, high in the Andes. It is a city of many contrasts; downtown, (as in all big cities), could be mistaken for New York, but the surrounding area is quite typically Spanish. The economy is based on its role as capital of the country, although there is also some industry and light farming. A very rich elite, a rapidly growing middle class, and a faster growing poor population, inhabit the city.

The Miseracordia, where I studied, was an antiquated, overcrowded, 400 bed hospital in the midst of a barrio (poor section). In our ward, Recuperacion, there were 12 children up to the age of 12 years, under treatment for malnutrition of the severest degree.

The typical course of events went like this: Maris Eugenia, aged six, fifth of eight living children. The father abandoned her pregnant mother several years ago. Now the children live with grandparents while the mother works in a nearby village. Their diet consists mainly of agua de panella (sugar and water), bread, potato soup and rice (never fruits or greens, and seldom high protein food). Because her mother was forced to work, Maria was never breast fed. Instead she was given half agua de panela and half milk (when they had enough money). The entire family lives in two small rooms without lights or water. The children bathe in a nearly murky river, dirtied by the runoff from their village.

Although Marie was very small for her age, she remained out of serious difficulty until developing a chronic diarrhea of eight months duration with Sarampion (measles) superimposed. On arrival at the hospital this fair haired (a sign of malnutrition) mestizo girl looked anything but lean. She was bloated out of proportion by Anasarca.

The doctors and dietitians at the Miseracordia held classes twice weekly to teach the mothers fundamentals of hygiene and diet. Samples of cheap, nutritious food were distributed to encourage their use. Although the classes were intended to last four sessions for each mother many kept coming back, again and again, long after their children left hospital. Often, even their cheap food was too expensive for their families. The effectiveness of this education program was evidenced by the frequent readmissions.

This experience shattered my ideas of how improvement of the quality of life could be achieved . Previously, I had believed (somewhat innocently) that the greatest obstacle to overcome was in educating people — the rest would follow.

But here in the Miseracordia, I had seen education fail dramatically.

Proponents of birth control might suggest this as a solution for many of the problems in the "developing" nations. Would Maria's situation have been basically different with fewer siblings? And how do you convince people that having fewer children is a good idea? Children bring supplements to the family income and security in old age. The economic conditions that breed such poverty, also breed the necessity to have many children. The voluntary limiting of family size won't come about until an economic position is reached with a reasonable standard of living (for example Japan and North America).

If education and birth control do not provide solutions in themselves, does a welfare system offer promise? Besides being degrading and unfeasible, the dole does not reach the basic problem.

Within a monopoly capitalist system, is it ever possible to make the necessary, far reaching changes? Capitalism is based on, and thrives upon the exploited. In the same way that one class is exploited by another, one country is exploited by another. Hence, the "developed" and "developing" nations. To make real improvements in the lives of three-quarters of the world's population another economic and political system must be found. China is proving that other solutions exist. □

*Fourth Year Medical Student, Dalhousie University, Halifax, N. S.

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First V. G. H. Lab. Behind Elevator

Bertha O. Archibald,*
Halifax, N. S.

I wonder how many people remember the poky little room back of the elevator shaft in the old Victoria General Hospital. In that room the Pathological Institute was started in 1896. Since that time it has had many subsequent abiding places.

Dr. W. H. Hattie was the director until 1901. In that year he became a member of the staff of the Nova Scotia Hospital at Dartmouth. He took the laboratory equipment with him and carried on for a short while until Dr. Andrew Holliday received the appointment as director. He moved the department to the Halifax Medical School at the corner of Carleton and College Streets.

In 1903 Dr. L. M. Murray became director and served until 1912. During that period the department was moved to the Technical College. Dr. George MacIntosh, who later became superintendent of the Victoria General Hospital spent many hours in the laboratory department during its stay in the Technical College.

In 1912 a little building on Morris Street (now University Avenue) was built on the present site of the Pathological Institute. Here Dr. Alex Lindsay really developed the department. That building was soon outgrown and had to be rebuilt in 1914, later enlarged and enlarged again.

Dr. Lindsay was a nephew of Dr. A. W. H. Lindsay who was, for many years, professor of anatomy at Dalhousie College and also the registrar of the Provincial Medical Board.

Dr. Alex Lindsay had taken passage for England on the "Empress of Ireland". In a dense fog at Rimouski in the St. Lawrence River a ten-thousand ton collier rammed the Empress and in 15 minutes she went down in the night. Only 433 were saved out of passenger list of 1,467 people. Dr. Lindsay was drowned. (He was on his way to England to be married).

Dr. A. J. Nicholls served from 1914 to 1926. The new building was opened in 1925. In 1926 after Dr. Nicholls resigned, the work of the Pathological Institute was divided into two sections — the Public Health Laboratory and the Pathological Laboratory.

Dr. D. J. McKenzie became director of the Public Health Laboratory from 1926 to 1962. He also directed the work in the Pathological Laboratory in 1926 and 1927 until Dr. Ralph Smith became director. When Dr. McKenzie resigned in 1962, Dr. C. E. VanRooyen became director of his department.

Dr. Ralph Smith was followed by Dr. J. W. Abbiss, Dr. N. G. B. MacLetchie, Dr. W. Taylor and Dr. D. V. W. Waugh. It is no longer called the Pathological Institute.

In the horse and buggy days, Dr. Montague Albert Smith of Dartmouth used to give lectures to his students on special techniques. At such times he would take them to the Pathological Department as he needed a Bunsen burner in his demonstrations.

It was a custom of the old doctor to rock back and forth on his heels while lecturing. On one occasion he was wearing a new light gray flannel jacket. It evidently had quite a lot of fuzz on it. Leaning back a little too far, the jacket caught fire from the Bunsen burner which in some miraculous way got too near the edge of the table.

There happened to be several beakers of cold water standing on the table. The students drenched him and, in no time, the fire was out.

The girls in the class sympathized with the doctor and offered to take the jacket home and patch it for him. This they did. But instead of trying to match the light gray flannel, they put a large red flannel patch on the jacket accidently on purpose. However the old doctor thanked them for their kindness and said "I will keep the jacket in the department and will just wear it when I am demonstrating." □

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*Pharmacist Retired — Victoria General Hospital, Halifax, N. S.

An Appreciation

DR. FLORENCE J. MURRAY

Since her retirement six years ago, Dr. Florence Murray has been a familiar figure in the Halifax area. She frequently visited the senior citizen's homes in the area — travelling the hard way, by city transport; she visited and entertained her many Korean friends in the vicinity; she never missed a meeting where women medical students or women doctors gathered; and the United Churches and all missionary societies and services had her constant support.

Florence came from a family of doctors, — one sister and three brothers — whose home life in various manses of the Maritime Provinces ably prepared them for their future profession. Graduating from Dalhousie Medical School in 1919, she went to Korea as a missionary where she served until the beginning of the second World War. During this period she took courses in Ophthalmology, Gynaecology and Obstetrics and Tuberculosis.

During World War II she was in private practice in Halifax and for a time was resident physician at the Nova Scotia Sanatorium in Kentville.

In 1944, the Nova Scotia Branch of the Federation of Medical Women of Canada was organized and Dr. Murray was one of the charter Branch members. Her interest in women doctors and in keeping them in touch with one another all over the world never waned.

In 1947 she returned to Korea to be associate Dean of a Women's University Medical Faculty in Seoul, and Acting Chief of the Paediatrics Department of the Severance Union Medical College. The Korean war forced her to leave in 1950, but she returned in 1951 to serve on the Danish Red Cross Hospital ship, for which service she received a medal from the King of Denmark.

Following the war she was in charge of the building of a new hospital in Wonju and became its medical director in 1959. In 1961 she retired from the United Church Overseas staff after a term of service of 40 years.

This was not, however, the end of service to her beloved Korea. She took a course in leprosy, returned to Korea to be physician and surgeon in a Mission to Lepers, and for five years following that she was chief of Medical Records Department in Severance Hospital.

In 1965 she received honorary degrees: D.D. from Pine Hill and LL.D. from Dalhousie.

In 1969 she received a medal for service from the President of Korea.

Her modesty is evident in her own words: "such a checkered career surely makes one a jack-of-all-trades and master of none, but no one has had more satisfaction in it than I".

Dr. Florence Murray in her home in Halifax, February 1973.

Although she was by birth and residence a Nova Scotian, she was a Korean at heart and was never at a loss for words to describe her life in Korea, praise the Korean people, talk about her beloved hospitals and lepers, and display her many pictures. Only last year she returned to Korea to visit her friends. The hospitals she built and the people to whom she brought health and happiness are a lasting memorial to this great lady.

On April 27th, 1975, the Nova Scotia Branch of the Federation of Medical Women of Canada held its annual meeting. One of the 55 women medical students present paid tribute to Dr. Murray and announced that a basket was on the table to receive donations to establish a memorial to her. $105.00 was collected. Further contributions may be sent to Dr. Margaret West, Treasurer, P.O. Box 1670, Halifax, N.S., B3J 3A5. □

E. MacL.

OBITUARIES

Dr. Charles J. W. Beckwith, 72, died in Halifax April 30, 1975. Born in Halifax he graduated from Dalhousie Medical School in 1927. Dr. Beckwith was the Executive Secretary of The Medical Society of Nova Scotia from 1956 until his retirement in 1968. He was a Senior Member of The Medical Society of Nova Scotia and an Honorary Member of The Canadian Medical Association. The Society extends sincere sympathy to his son and sisters.

The death of **Dr. Alexander J. Murchison,** 37, occured on May 4, 1975 in Halifax, N.S. He was born in Prince Edward Island, the son of Dr. & Mrs. A. J. Murchison of Charlottetown, P.E.I. He graduated in medicine from Dalhousie University in 1963 and has been practicing in Halifax, N.S. Our sympathy is extended to his family.

Dr. Florence J. Murray, 81, died on April 14, 1975 in Halifax, N.S. Born in Pictou Landing she graduated from Prince of Wales College, P.E.I. and Dalhousie University. She spent most of her life as a Medical Missionary in Korea. The Bulletin offers sincere sympathy to her family.

Dr. James W. Reid, 71, Halifax died May 10, 1975 in the Victoria General Hospital. Born in Windsor, he graduated from Dalhousie Medical School in 1926. He retired from active practice in 1968. He was Past President of The Medical Society of Nova Scotia and a Senior Member. Sincere sympathy is extended to his widow, son and daughter.

Dr. Garnett W. Turner, 60, died June 1, 1975 in the Victoria General Hospital. Born in Chester Basin, he graduated from Dalhousie University in 1941. He practiced in Windsor, Nova Scotia, and was a Past President of The Medical Society of Nova Scotia. Sincere sympathy is extended to Mrs. Turner and his family. □

ULTRASOUND — A DIAGNOSTIC TOOL

Continued from page 90.

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CELSIUS TEMPERATURE CONVERSION

On April 1, 1975, all references to atmospheric temperature on Canadian television, radio and in written media, will be given in degrees Celsius (°C). This scale (known to many as Centigrade) is the one used by those countries which operate in metrics.

In adjusting to the new scale, we strongly suggest that you do *not* attempt to convert to Fahrenheit when you are given a Celsius temperature. The following points of reference should permit you to use Celsius without reference to Fahrenheit:

100°C — the *boiling* point of water
37°C — normal *body* temperature
20°C — normal *room* temperature
0°C — the *freezing* point of water

Good luck and THINK METRIC! □

Physician Self-Assessment

Question No. 18 Correct Answer D

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