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ABSTRACT

Rapid but orderly progress in the development of urgently needed health manpower and training facilities in Ontario can be achieved only by close collaboration between the educational institutions and agencies of government responsible for this field. Individual universities must consolidate the administration of health science programs on campus and in affiliated hospitals and work closely with other universities and the Senior Co-ordinating Committee of the Departments of Health and University Affairs in evolving a rational pattern for the province. Ontario universities cannot satisfy the demands of all the health professions for all levels of education without overwhelming the limited resources available. Thus, universities should establish priorities with respect to the type of professional and technological training programs that they sponsor and the objectives of these programs. In addition, inter-university cooperation should be practiced to the fullest that duplication might be avoided. (Author/HS)

THE HEALTH SCIENCES IN ONTARIO UNIVERSITIES

RECENT EXPERIENCE AND PROSPECTS FOR THE NEXT DECADE

A Report of the Presidents' Research Committee to the Committee of Presidents of Universities of Ontario

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4 Devonshire Place, Toronto 5, Ontario

June 1966

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June 1966

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Reports of the Committee of Presidents

Available from the office of the Committee:

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Preface

In 1962, the Committee of Presidents submitted to the Government of Ontario a report entitled *Post Secondary Education in Ontario, 1962–70*, an outline of necessary development during the balance of the decade. In 1966, the Presidents' Research Committee presented to the Committee of Presidents a draft report, entitled "From the Sixties to the Seventies: An Appraisal of Higher Education in Ontario," which was essentially a review of progress made in the intervening four years and a revised look at the future. A chapter on "The Health Sciences" was contributed by Dr. John R. Evans, a member of the Research Committee.

When the Committee of Presidents had their first look at the review of progress, in June, they decided that because of the special current interest in health science education, the section dealing with that subject should be published separately, and in advance of the balance of the report. It is presented for discussion now with the hope that the information on the health sciences will be helpful to those concerned with the urgent problems in this field.

The data included in the report were obtained directly from the universities involved, through their senior university representatives in the health sciences. In the course of preparation, the text was reviewed and criticized by senior administrative officers in medicine, dentistry, nursing, and pharmacy in Ontario universities.

J. A. Corry
Chairman, Committee of
Presidents of Universities
of Ontario

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The Health Sciences in Ontario Universities

INTRODUCTION

The interval 1962–6 has been a period of searching appraisal of health needs and resources in Canada. The latter portion has also been a period for formulating plans to increase the quantity, quality, and diversity of health manpower for the next decade. The analysis and recommendations of the Royal Commission on Health Services, appearing in 1964 and 1965, have provided a solid base for projection of future needs and advice on the means of meeting these needs. Ontario universities were encouraged to initiate formal planning in the health science field by the announcement of Prime Minister Robarts in late 1964 that the province would support the expansion of the four existing medical schools and their teaching hospitals, the development of a fifth medical school at McMaster University, and a second dental school at the University of Western Ontario. Subsequently, the federal government established the Health Resources Fund, a capital fund of $500 million to assist the provinces in the construction of educational and research facilities for the health sciences. The announcements of government support and the pressing need for improved and expanded facilities for the health sciences have stimulated the universities to give high priority to detailed planning of these developments. At the same time the prospect of improved physical facilities has emphasized even more strongly the serious deficiencies in the supply of teachers and health scientists, the support of health science research, and the financing of operating costs of the teaching centres. These deficiencies have been recognized previously, but their importance has been obscured by the comparatively static condition of health

science education and research in Canada since the Second World War.

The present survey notes changes during the five-year period since the first report of the Ontario university presidents and describes university programmes proposed for the next decade. Deficiencies and obstacles which could undermine the success of these important and costly programmes in the health sciences are discussed, and some approaches to the solution of these problems are offered.

Veterinary medicine is not included in this report, but a closer relationship between veterinary medicine and the health sciences should be mutually advantageous and is a desirable objective for the future.

CHANGING ROLE OF THE UNIVERSITY IN HEALTH SCIENCE EDUCATION

Integration of educational programmes for health professions

By tradition educational programmes for the different health professions have developed separately but it is increasingly apparent that they have much in common. The recent trend to consolidate within the university the facilities for all health science programmes has emerged in two Ontario universities and is projected in a third. Under such an arrangement the same basic departments of biological and social sciences subserve the needs of each of the health professions. The centrality of the basic medical sciences to the whole of health sciences warrants special emphasis. In addition, in the health science centre the expensive core facilities for patient care, the teaching hospital, and ambulatory centre can be shared for clinical training. By training together, the various health professions have the opportunity to develop understanding and mutual respect, thereby improving the chance of establishing an effective working relationship in practice. With increasing specialization and with the widening gap between demand for health services and the supply of physicians to provide these services, delegation of responsibility by the physician and teamwork among health personnel in practice assume increasing importance. The development of the health science centre recognizes the urgent need for large numbers of all types of health personnel and the desirability of training them to function interdependently as a team.

Demands on university

From all quarters come demands for increased university involvement in education, research, and community service. The health sciences are no exception. Teaching and research programmes have expanded into new areas such as molecular biology, biomedical engineering, and the behavioural sciences. There is an urgent need for a vastly expanded graduate training programme to prepare teachers for all the health professions. The profusion of postgraduate specialty training programmes in medicine and the demand for continuing medical education for the practising physician have imposed a formidable teaching responsibility on the faculties of medicine which exceeds the time commitment to undergraduate education. A similar trend may be anticipated in both dentistry and nursing. By virtue of the calibre of professional staff and the special diagnostic and treatment facilities available, the university medical centre has become the site for referral of special clinical problems. To fulfil its responsibilities for undergraduate, graduate, and continuing education, to advance science through research, and to function as a regional referral centre for patient services imposes an enormous load on the faculty and facilities of the university health science centre. It is difficult, however, to envisage a satisfactory alternative to the university as a base for discharging most of these responsibilities.

Proposed role of university in education of health professionals

The extent to which a university can participate in training programmes for the health professions must be in accord with its resources, in particular, the availability of teaching staff. It seems unnecessary and unwise for universities to assume total responsibility in this area lest the added burden dilute and obscure the principal purpose of university affiliation. Three categories of involvement are proposed:

Primary university responsibility

(1) *Medicine, dentistry, public health, medical social work, clinical psychology, and speech therapy and audiology* Primary responsibility for all programmes in these fields must rest with the university. Commitment to these programmes is given priority because they depend to a major degree on specialized educational resources only available in universities, e.g. the basic medical, biological, and social sciences. Residency training of physicians and surgeons and programmes of continuing education need *not* be confined to the university and its affiliated hospitals. The universities should contribute to such programmes when this is possible but may be spared the burden of administration.

For reasons of convenience it may be desirable to include in the

universities, programmes in dental hygiene, medical librarianship, and medical art.

Partial university responsibility

(2) *Nursing, pharmacy, physiotherapy, occupational therapy and dietetics* Universities should share with technical colleges and hospitals the responsibility of rectifying the serious shortages of professionally qualified personnel in each of these five fields. The objective of the university programmes at this time should be the preparation of individuals to take leadership and responsibility in clinical care and the development of graduate programmes in professional education, administration, research, and the clinical specialties. The larger numbers of health personnel required in each of these fields should be trained in hospital schools or technical colleges in shorter programmes with less stringent admission requirements. It is essential to establish close liaison between the two types of programmes and to provide a means of entering university degree programmes, possibly with advanced standing, for specially qualified graduates of the diploma schools. Close co-operation in the training of health personnel between Colleges of Applied Arts and Technology and universities could serve to strengthen both institutions.

Minimal university responsibility

(3) *Health technology* Primary responsibility for the training of radiographers medical photographers, medical records librarians, orthoptists, laboratory technicians, medical electronics technicians, dental technicians, dental assistants, and a variety of other important technical specialties should rest with Colleges of Applied Arts and Technology, hospital schools, and the Provincial Institutes of Trades.

Our earlier reports, in 1962, suggested transfer of diploma courses of a technological nature from universities to institutes of technology. It was surmised that the increasing demand for technical personnel in medicine, dentistry, pharmacy, and nursing might warrant establishing one or more institutes specializing in health services since much of the theoretical knowledge needed was common to all these fields. Such institutes should be located in centres where large hospitals are available.

Planning council for health related professions

Transfer of programmes now given in universities to technical colleges and hospitals will be exceedingly difficult. Professional associations are concerned not only with promoting the interests of their members but also with the establishment of certain standards of education. If university courses are held to be a prerequisite for membership, professional associations may protest against the development of non-university programmes with

different educational qualifications. To resolve the expected differences of opinion it would be wise to implement at an early date the recommendation of the Royal Commission on Health Services that there should be a planning council for health related professions, preferably with its own secretariat, to study the type of training programmes required by the health related professions and advise where training centres should be established. Such a council should include members of government, educators, and representatives of the interested professions.

Clinical specialty training and continuing education

In view of the proliferation of full-time postgraduate programmes of specialized professional education and the rising proportion of medical graduates who take three to six years of advanced clinical training, each university must carefully appraise the extent to which it can afford to participate in these programmes. In some centres it may be logical for the university to take complete responsibility for all aspects of specialty and continuing education. In others, particularly those located in large metropolitan areas, direct and continuing responsibility might overwhelm university resources and in such centres the university should function as a catalyst in the development of these programmes in collaboration with professional organizations and health agencies.

PROGRAMMES AND ENROLMENT 1961–2 to 1975–6

Undergraduate course changes

Enrolment in university programmes in the health sciences during the five-year period of 1961–2 to 1965–6 is summarized in Table 1. No major changes in health science programmes were made during this interval. A seven-year combined biology and medicine course was initiated for 35 students at the University of Toronto in 1962, but in two universities the influence of the faculty of medicine on premedical studies was reduced.

Increases in enrolment

The actual enrolment in first degree programmes during the five-year period increased by 8 per cent in medicine, 14 per cent in dentistry, 6 per cent in pharmacy, 18 per cent in physical and occupational therapy, and 60 per cent in nursing.

With the exception of pharmacy, the relatively minor increases in undergraduate enrolment were due to limited capacity of the courses, not the number of qualified students who applied. In the case of dentistry the ratio of qualified Canadian applicants

TABLE 1

TOTAL STUDENT ENROLMENT, FULL-TIME PROGRAMMES*

	Years to completion	61/2	62/3	63/4	64/5	65/6	66/7	67/8	68/9	69/70	70/1	71/2	72/3	73/4	74/5	75/6	Maximum Number Graduates 1976
MEDICINE																	
Undergrad.	4	1260	1266	1263	1306	1365	1423	1475	1542	1695	1816	1939	2100	2185	2220	2245	550
Postgrad. specialty training	3–5	643	674	694	684	759	765	810	845	881	920	953	1031	1074	1107	1135	350
Master's	1–2	53	69	66	79	103	144	179	203	247	303	328	370	421	473	515	450
Doctorate	3–4	67	90	97	103	123	157	189	222	268	311	345	374	428	482	526	150
Other		5	13	17	25	23	24	34	44	54	69	80	92	104	116	128	120
B.Sc. Tor.	1																
D. Clin. Sci.	4																
DENTISTRY																	
Undergrad.	4	433	479	476	489	495	503	511	543	575	615	685	756	831	875	914	225
Postgrad. specialty training	3–5	20	21	20	25	31	32	35	40	47	55	62	69	76	84	93	40
Master's	2	5	4	4	10	10	10	13	17	21	27	30	33	36	39	42	20
Doctorate	3–4						2	3	5	5	7	7	8	8	9	9	3
Other																	
B.Sc. Tor.	1	5	1	3	6	6	8	10	11	12	14	16	18	20	22	24	24
Dipl. Dental Hygiene	2	58	88	91	94	94	95	95	95	105	115	125	135	135	135	135	65
NURSING																	
Degree undergrad., univ.†	1–4	408	406	482	554	654	768	989	1066	1215	1355	1464	1521	1599	1599	1649	435
Cert. post RN	1	419	492	430	465	398	330	170	170	110	60	60	60	60	60	60	60
Master's	2	12	8	9	10	9	13	17	18	22	25	28	32	38	50	60	30

TABLE 1—*Continued*

	Years to completion	61/2	62/3	63/4	64/5	65/6	66/7	67/8	68/9	69/70	70/1	71/2	72/3	73/4	74/5	75/6	Maximum Number Graduates 1976
PHARMACY																	
Undergrad.	4	391	424	410	403	414	440	460	485	495	500	505	510	510	510	510	125
Postgrad. specialty training	1	2	1	1	4	3	3	5	6	7	8	8	9	9	10	12	12
Master's	? 1–2	10	12	18	15	23	25	28	32	36	40	44	48	50	52	55	30
Doctorate	? 3–4			1	2	2	3	4	4	5	6	8	8	9	10	10	3
PHYSIO AND OT																	PT 155
Degree or Dipl.	2–4	232	304	295	293	274	290	340	440	580	685	725	755	795	805	825	OT 90
Master's	1											4	4	4	4	4	4
SPEECH THERAPY																	
Dipl.	2–3	5	11	17	18	13	15	17	19	21	23	33	43	54	59	64	25
PUBLIC HEALTH																	
Master's	1–2	10	9	10	18	26	41	45	51	61	71	81	91	101	111	112	
Doctorate	2–4	4	9	10	12	14	20	24	27	37	47	57	65	70	75	80	
Diploma	1–2	93	92	111	92	171	192	206	216	226	236	246	256	266	276	286	

*Figures derived from data obtained directly from individual universities in April 1966.

†Does not include enrolment at proposed schools at Laurentian and Lakehead or part-time students at Toronto.

for each place available in the entering class was 1.8:1 in 1965.

Reservoir of suitable applicants

However, the impression of a wealth of suitable applicants for medicine was recently negated by a study of multiple applications to twelve Canadian medical faculties that indicated only a small surplus of suitable applicants over actual intake (D. G. Fish and J. W. Macleod, *Canadian Medical Association Journal,* 92: 698, 1965). There would appear to be a substantial reservoir of suitable female applicants for university programmes in nursing, physiotherapy, and occupational therapy, but to date there has been almost no interest shown by male students in these programmes.

Postgraduate training

As noted in Table 1, the major postgraduate commitment of faculties of medicine and dentistry has been advanced professional training in clinical specialties. However, enrolment in master's and doctoral programmes in the basic medical sciences has doubled during the five-year period. In dental sciences the small enrolment in the master's programme has increased, but no candidates have undertaken doctoral studies. Graduate student programmes in public health and in pharmacy have increased substantially, but enrolment in the only Ontario graduate school of nursing has remained consistently low. The small number of graduate students emerging from health science programmes in Ontario falls far short of the requirement for qualified teachers and scientists in our expanding universities, to say nothing of the increasing demands of government departments, industry, hospitals, and other employers. The suboptimal growth of our graduate programmes must be attributed to inadequate facilities, difficulty in financing graduate education, and to lack of inducements for talented graduates to pursue an academic career in the health sciences.

Need for health personnel

The Royal Commission on Health Services documented the pressing need to increase the number of personnel trained for nearly all the health professions in Canada. It is difficult to arrive at accurate projections of the enrolment in Ontario universities required to produce health personnel in numbers adequate to meet the expected demands. Furthermore in projecting the responsibilities of Ontario universities it is not sufficient to consider only the needs of this province; allowance must be made for other parts of Canada and for underdeveloped countries abroad. It would be an immense advantage if conditions of employment for the various health professions were such

that the substantial contribution of health personnel to the United States was decreased.

Role of health science centre

Of particular concern in the development of new programmes is the long time required to plan and construct facilities particularly in the case of medicine and dentistry. The concept of developing training programmes for the various health professions in a university health science centre offers the advantage of flexibility in the expansion or addition of new programmes since the facilities for basic science instruction and patient care can be used by all the professions. This concept fits well with the viewpoint previously expressed that there should be a systematic sharing of the responsibility for training various types of health personnel between Colleges of Applied Arts and Technology and universities.

Graduate studies

It should be emphasized that the highest priority in the expansion of university programmes in the health sciences must be the development of satisfactory graduate programmes for the training of teachers, scientists, administrators, and clinical specialists. For the most part these programmes are inadequate in size and quality and unless this deficiency is rectified it will prove difficult if not impossible to develop the calibre of undergraduate professional programmes on which the future standards of health care in Canada depend.

Medicine

Undergraduate programmes

Enrolment in the four Ontario medical schools will increase over the next five years. The number of places added at the University of Toronto will be equivalent to an entire medical school. McMaster University should be ready to accept medical students by 1969. Total enrolment will increase 33 per cent by 1970–1 and 65 per cent by 1975–6. Assuming net undergraduate attrition of 10 per cent or less, Ontario medical schools should produce 500 graduates annually by 1973. York University recently announced its intention to establish a faculty of medicine in the early 1970s, but it is unlikely that graduates would emerge during the decade under consideration. The Committee is not aware of other plans for medicine at Ontario universities before 1976.

Graduate training

A substantial increase in the various graduate programmes is also forecast in medicine. A striking increase in the number of

graduate students trained in biomedical research under the auspices of faculties of medicine is anticipated. Both master's and doctoral programmes are expected to double within four years and quadruple by 1975. The increased output of potential teachers and medical scientists from our universities is an urgent and essential development. However, the major impact will not be felt until 1972 and then only if conditions are conducive to the selection of an academic career. The number of physicians engaged in advanced clinical training leading to specialized professional qualifications is expected to increase by about 50 per cent over the decade.

Continuing education

At least 10 per cent of the total teaching effort in clinical departments of faculties of medicine will be directed to programmes of continuing education. It is of interest in this respect that at one Ontario university the faculty of medicine provided intramural and extramural refresher courses for 2,356 students in 1965–6.

Dentistry

Undergraduate programmes

The second dental faculty in Ontario is scheduled to enroll a pilot class at the University of Western Ontario in 1966 and will produce its first graduates in 1970. Since the capacity of the Faculty of Dentistry at the University of Toronto is fixed at 125 students per year, the annual output of the two schools by 1975 is not likely to exceed 165 to 170 dentists. On the basis of projections of need by the Royal Commission on Health Services, and assuming that Ontario should shoulder responsibility for training about one-third of the dentists in Canada, it would appear that an additional dental school should be producing graduates by 1975, and that planning for this school should begin not later than 1968. The third school should be in a university with a medical school where qualified instructors in the basic sciences are available.

Graduate training

The provision of faculty for dental schools is a serious problem. According to Dr. K. J. Paynter, Faculty of Dentistry, University of Toronto, the Canadian Dental Schools require 80 additional full-time staff at the present time and a further increase of 18 per year is estimated. Augmented graduate programmes are urgently required to prepare more dental teachers and scientists. Expansion of clinical specialty training will pro-

duce some teachers but at the same time increase service demands on existing faculty.

Other dental personnel

Utilization of dental auxiliaries has been demonstrated to increase the productivity of dentists and it is highly desirable to initiate programmes in this field. The two-year course for dental hygienists at the University of Toronto reached a plateau in enrolment in 1963 (see Table 1). The University of Western Ontario plans to initiate training of dental hygienists in 1969–70.

Nursing

Undergraduate programmes

New degree programmes in nursing, completely under university auspices, are anticipated in 1966 or 1967 at Lakehead and Laurentian Universities and combined five-year hospital and university programmes which now exist at three universities will be replaced by four-year courses completely under university supervision in the near future. Total enrolment in university nursing programmes is expected to double within five years and with the developments at Lakehead and Laurentian Universities will undoubtedly triple by 1975–6.

Certificate courses

There has been no increase in the number of graduates of diploma schools enrolled in the one-year university certificate course in nursing over the past five years. Three of the five universities involved in this programme have indicated their intention to abolish it in the near future. While the advantages of a complete university programme in nursing education are acknowledged, it is most important that a mechanism is provided for diploma nurses of high quality to enter university degree programmes and to qualify if desired for graduate studies in nursing.

Graduate training

Only one graduate degree programme in nursing exists at the present time and it is confined to nursing administration. It is an urgent requirement that graduate student training be expanded and broadened to include nursing education and the clinical specialties. Two universities considering the establishment of graduate programmes in the early 1970s should be encouraged to bring forward the date of initiation of these programmes as much as possible.

University role in nursing educatinn

It is difficult to estimate the number of nurses required in Ontario and to assess the responsibility of the universities in this field. The objective in Ontario is to qualify about 5,000 nurses

per year by 1971—approximately twice the provincial graduating class of 1966. If the proposal of the Royal Commission on Health Services that one-quarter of nursing graduates should have university degrees is accepted, then university programmes for nurses would need to be expanded more than ten-fold. It is the opinion of the Committee that more important than increasing the number of bachelor's candidates at this time would be an investment of university facilities and staff time in the development of graduate programmes in nursing education, administration, and the clinical specialties. This consideration takes priority for without an increased number of teachers, administrators, and specialists, the standards of existing and proposed programmes in nursing will certainly suffer. Furthermore new major responsibilities in the field of continuing education are emerging and university teachers and specialists will be expected to provide leadership.

Pharmacy

No plans for new schools of pharmacy have been submitted, and expansion of enrolment in the existing school at the University of Toronto is projected at less than 25 per cent over the next ten years.

It is probable that further study will show that the main part of any expansion of university programmes should be at the graduate level, with master's and doctoral work developing in close relationship to programmes in chemistry, biology, and medicine. It is doubtful that additional undergraduate expansion at the university level, beyond that projected at the University of Toronto is required. It is reasonable to expect that different types of training programmes for pharmacists will emerge and that some of these may be managed effectively in other post-secondary institutions, but this is frankly a controversial issue.

Before undertaking new university programmes in this field, the professional training experiments should be carefully re-examined in terms of the future role of the pharmacist in the delivery of health care in the community. Such a study could logically be referred for discussion to a provincial planning council for health related professions.

Physiotherapy, Occupational Therapy, and Speech Therapy

Shortage of physiotherapists

To rectify the serious shortage of professionally qualified physiotherapists, the Canadian Physiotherapy Association recom-

mended to the Royal Commission on Health Services that nine additional schools of physiotherapy be established in Canada by 1971. In view of the present trend to develop health science centres and the tendency of students in physiotherapy to practise in close relation to their schools of graduation, it may be advantageous to create smaller schools of physiotherapy, in relation to each of the Ontario medical schools, rather than consolidating training for this profession in one or two large centres. The undergraduate degree or diploma programmes, projected over the next decade in Ontario universities, might be expected to produce approximately 250 graduates in physio- and occupational therapy, the majority of these being physiotherapists.

Training programmes for physiotherapy

In order to provide the large number of physiotherapists required in the community there also appears to be a need for shorter diploma programmes which might be established at Colleges of Applied Arts and Technology. A major objective of university programmes in physiotherapy should be the preparation of individuals to take leadership and responsibility in teaching and administration and patient care. It is logical that graduate work should evolve in this field. A master's programme is projected at one university to begin in 1971–2.

Occupational therapy

The considerations bearing on physiotherapy also apply to occupational therapy. The Rehabilitation Committee of the Canadian Medical Association recommended a ratio of at least one occupational therapist per 15,000 population. When surveyed in Ontario in 1962 the ratio was less than half the desired level. With increasing attention to the rehabilitation of handicapped children, the aged, alcoholics, and the mentally ill both in hospital and in the community, the demand for occupational therapists is bound to rise.

Speech therapy and audiology

The Medical Rehabilitation and Disability Advisory Service of the Department of National Health and Welfare recommended in 1961 that the number of qualified speech therapists and audiologists should be increased four-fold to meet estimated requirements. Since existing courses graduate only 12 speech therapists annually and another 10 to 20 foreign trained therapists migrate each year to Canada, the present deficit of 300 to 400 speech therapists will not be rectified unless the present programmes are expanded by more than three times that currently anticipated. New programmes logically belong in a university health science centre with a close relationship to behavioural and neurological sciences.

Medical Social Work

Lack of programmes

In Ontario, adequately trained medical social workers are rare and the demand is great. At present a medical social worker requires a BA, graduate training in a school of social work, and supervised clinical experience. No formal programme in medical social work exists.

Development of training

There is need for shorter programmes possibly at undergraduate level and a number of Ontario universities are considering the establishment of programmes leading to a bachelor's degree in social work. Students in such courses would be encouraged to acquire practical experience in medical or other settings during the summers between undergraduate years. Training grants for this important practical component of their education would be essential. Establishment of new programmes of social work in collaboration with or as an integral part of a health science centre would provide medical experience for students in social work and permit study of the role of the medical social worker in the delivery of health care.

Clinical Psychology

Role in health sciences

Much of the evaluation and care of mentally disturbed patients and a major responsibility for mental health education must rest with the clinical psychologist. A partnership between clinical psychologists, psychiatrists, and other physicians provides the most effective relationship both for clinical work and for education of the health professions.

New programmes

The development of new clinically oriented graduate programmes and possibly undergraduate programmes should be carefully explored as a means of increasing the availability of clinical psychologists. The current deficiency of personnel in this field is likely to increase with a variety of new demands, and the staggering backlog of unattended problems in mental health makes mandatory an aggressive approach to university training programmes for clinical psychologists. Once again it would be advantageous to develop some of these programmes in situations where the assets of both the university department of psychology and a health science centre can be brought together.

Public Health

The School of Hygiene of the University of Toronto is unique in English-speaking Canada in providing diploma programmes in

medical, dental, and veterinary public health in addition to its programmes in hospital administration, microbiology, nutrition, industrial health, and graduate studies. There is need to support and enlarge some of these programmes which are of national and international importance. In view of the changing nature of health services, there is reason to review now the objectives and location of expanded programmes in health administration.

Medical Librarianship

There is a serious shortage of qualified medical librarians. In a 1964 report entitled "Library Support of Medical Education and Research in Canada," Beatrice V. Simon recommended starting a pilot programme at an accredited Canadian library school for training medical science librarians at the postgraduate level of library science. She also proposed that annual scholarships be established to enable librarians already working in medical libraries to enroll in summer courses in medical bibliography now available in the United States and proposed for Canadian universities. It is hoped that both proposals will be implemented in the near future.

CONSTRUCTION AND RENOVATION OF HEALTH SCIENCE FACILITIES

Expansion of facilities

According to present plans space available for teaching and research in the health sciences at five universities and their teaching hospitals is expected to double by 1969 and triple by 1971 (see Table 2). The provision of facilities for the health sciences is long overdue and the advent of Medicare has brought attention to existing deficiencies and the need for expansion to meet future demands. Expansion is being planned throughout Canada, and the opening of nearly all the new facilities will coincide during the period 1969–71. As a consequence, there will be an abrupt increase in the number of places available for students, a sudden demand for large numbers of highly trained faculty, and a precipitous increase in the need for money to purchase scientific equipment, finance research, and offset current expenses. Unless appropriate provisions are made to meet these demands, the pressing need for buildings could become an embarrassment to the university and to the province.

TABLE 2

ESTIMATE OF TEACHING AND RESEARCH SPACE FOR HEALTH SCIENCES*
(Thousands of net square feet)

	61/2	62/3	63/4	64/5	65/6	66/7	67/8	68/9	69/70	70/1	71/2	72/3	73/4	74/5	75/6
University	580	583	650	651	716	878	924	972	1,368	1,664	1,961	1,961	1,961	1,976	1,976
Teaching hospitals	178	184	184	195	220	220	235	328	442	984	964	1,014	1,014	1,014	1,014
TOTAL	758	767	834	846	936	1,098	1,159	1,300	1,810	2,648	2,925	2,975	2,975	2,990	2,990

*Data supplied by individual universities in April 1966.

ACQUISITION OF FACULTY

Critical shortage of faculty

The basic requirement for the expanding educational programmes in the health sciences is a large number of highly trained teachers and biomedical scientists who will contribute to undergraduate, graduate and continuing education, and scientific research. Suitably qualified staff are in extremely short supply and there is fierce competition for them from elsewhere in Canada and the United States.

Growth of full-time faculty

Table 3 depicts buildup of full-time faculty during the past five years and projections for the next decade in the various divisions of health sciences. Part-time staff are included as full-time equivalents based on the proportion of full-time devoted to university duties. The data show that in contrast with the slow acquisition of faculty over the past five years there is projected a very rapid increase between 1966 and 1971 in all groups except pharmacy and public health. The crisis in staff manpower will occur over the next five years during which time the number of faculty in basic medical science, clinical medicine, nursing, and physical and occupational therapy must be more than doubled. During the same period full-time dental faculty must increase by 75 per cent. The output of graduate student programmes in Ontario universities cannot possibly meet the need in time since the major harvest from these programmes cannot be expected until 1972 (see Table 1).

Sources of faculty

The sources of faculty are limited. Teachers and scientists in Canada must be encouraged to remain in academic work and Canadian teacher-scientists and graduate students now employed in the United States must be attracted back to Canada if possible. In addition more of our outstanding undergraduates must be encouraged to pursue academic careers in the health sciences. None of these measures, however, will be fully effective unless a more favourable environment for employment and, in particular, better support of health science research exists in Ontario universities.

FINANCING OF UNIVERSITY PROGRAMMES IN HEALTH SCIENCES

Capital Programmes

Processing of requests for support

The province of Ontario and the federal government, through the Health Resources Fund, have approved in principle capital

TABLE 3

BUILDUP OF FACULTY IN HEALTH SCIENCES*
(Full time or full time equivalent†)

	61/2	62/3	63/4	64/5	65/6	66/7	67/8	68/9	69/70	70/1	71/2	72/3	73/4	74/5	75/6
MEDICINE															
Basic Science	146	157	170	190	209	256	312	348	393	426	449	485	498	516	530
Clinical	264	269	285	308	342	437	490	544	626	687	742	782	795	806	817
Total	410	426	464	498	551	693	802	892	1019	1113	1191	1267	1293	1322	1347
DENTISTRY	50	51	54	59	62	67	77	89	99	108	118	130	137	140	141
PHARMACY	13	13	14	15	16	18	21	22	23	23	24	25	26	27	28
NURSING‡	33	41	51	56	64	76	94	111	128	138	145	151	155	167	173
P AND OT	14	17	18	20	19	23	30	44	57	64	69	78	83	83	84
PUBLIC HEALTH	28	28	28	28	54	54	54	76	76	76	91	91	91	91	91

*Data obtained from individual universities in April 1966.
†For definition of full-time equivalent see page 17.
‡Faculty for the proposed schools at Laurentian and Lakehead not included.

programmes in the health sciences involving construction of teaching and research facilities in universities and their affiliated hospitals. All requests for support from the federal Health Resources Fund are to be channelled through the provincial government. Early in 1966 the Ministers of Health and University Affairs established a senior committee for co-ordination and planning with the Deputy Minister of Health as Chairman and including the Deputy Minister of University Affairs and the Chairman of the Ontario Hospital Services Commission. Applications by universities for support of health science projects which are approved by the Senior Co-ordinating Committee will be eligible for joint financial sponsorship from the federal and provincial governments.

Capital requirements

The original description of the Health Resources Fund indicated that the capital sum of $500 million would be spent over a fifteen-year period and, assuming equal distribution of the total fund over this period and a provincial division on the basis of population, Ontario might expect to receive about $11.4 million per year. This federal contribution is extremely small in relation to the necessary expenditure of over $300 million which is anticipated for the capital programmes of university health science centres in Ontario over the next five years. It would appear that the capital requirements for the health sciences may not have been fully appreciated by the federal government at the time the Health Resources Fund was established.

Provision of scientific equipment

It is imperative that the capital programmes for the new health science facilities include basic scientific equipment without which the facilities cannot possibly become operational. At the present time in Canada no alternative source of funds is available which would be adequate to finance the purchase of this expensive equipment. In a recent survey, entitled "Medical Research in Canada," it was estimated that between $40,000 and $50,000 should be allowed for each full-time member of the professorial staff of faculties of medicine who is engaged in research. The survey assumed that 90 per cent of the new full-time staff of Ontario medical schools would be engaged in research, and projected initial costs of $17 million to $22 million for research and graduate student training facilities that will become available by 1971. It bears repeating that at the present time full-time staff will not join faculties of medicine lacking research facilities.

Operating Funds

Programme costs

The principal source of funds for operating expenses of health science programmes is provincial government grants. A study of income and programme costs of Canadian medical schools being carried out by Mr. D. G. Fish of the Association of Canadian Medical Colleges indicates that estimated expenditures on undergraduate medical education are greatly in excess of tuition fees and that research income rarely covers more than two-thirds of the cost of research programmes. If undergraduate education, research, and graduate student training are to increase, a substantially greater allowance must be made to cover overhead costs of these programmes. A large component of the operating budget is salaries for full-time staff, and these must be competitive if recruitment is to be successful. Part-time staff must also be reimbursed appropriately for their valuable teaching contributions. At the present time a large proportion of clinical teaching in Ontario medical and dental schools is done by part-time physicians and dentists who depend on outside private practice for their income and receive only a small honorarium from the university.

Salaries for full- and part-time staff

Long range support of operating costs

A shortage of funds for current expenses and the year to year uncertainty about availability of funds have seriously handicapped development of urgently needed educational, research, and service programmes at Ontario medical schools and have interfered with long range planning. A substantial increase in operating costs of health science programmes is forecast, particularly over the next five years of rapid expansion. Universities must have assurance of support of their programmes well in advance since a real measure of financial security is indispensable to planning and recruitment of staff. Formula financing as proposed by the Bladen Report, *Financing Higher Education in Canada*, has great merit providing the formula is regularly revised and weighted to allow for the substantial extra cost of programmes of clinical specialty training and continuing education in the health sciences.

Formula financing

Student Trainee Support

Undergraduate bursaries

The high cost of professional education may deter students from lower income families from applying for medicine and dentistry. In 1961–2 the cost per annum to the student averaged $2,465 in dentistry and $2,246 in medicine. With the expansion of places for all types of health science training it is essential that

financial deterrents to application be eliminated by appropriate student assistance.

Fellowships for senior medical and dental students

In the final years of medical and dental programmes the students have reached a level comparable to graduate students and should therefore qualify for postgraduate fellowships on the basis of academic experience. Fellowships would free the students from the financial obligation to take a summer job and would permit them to use their summer for organized educational and research experience which could enrich and shorten their over-all programme. In view of the length of professional education, loans would not substitute for fellowship support. The Royal Commission on Health Services recommended a grant of $2,000 per year at the beginning of the third medical year.

Postgraduate training grants

Greatly increased financial assistance is required for graduate students in all branches of the health sciences if the universities are to train the large numbers of teachers and scientists required for their expanded programmes in this field. It is encouraging to note that the 1966 provincial budget includes provision for post-graduate training grants administered by the Department of Health. If students of high quality are to be attracted to the graduate training programmes it is essential that the training grants and research fellowships be realistic in value as well as adequate in number.

Support of Medical Research

Health science research

Medical research has expanded rapidly in recent years and overshadows research in the other health sciences. It is noteworthy, however, that much of the research effort is in the basic medical sciences which are fundamental to the educational programmes of all the health professions.

Survey of need for research support in Canada

In a recently published report, *Medical Research in Canada*, professional consultants surveyed the present status of medical research and projected the financial commitment required to support a desirable level of research activity in Canada over the period 1965–70. Based on the assumptions used in this report, the total annual operating requirements for research programmes and the research component of salary costs in Ontario medical schools should have been $14 million in 1965–6 and should rise to over $30 million in 1969–70. Of the funds now available in Canada for the support of research from federal sources and voluntary health agencies, Ontario might expect to attract on the

Shortage of research funds

basis of population less than $7 million in 1965–6 and about $11 million in 1969–70. Failing a radical change in granting policy, therefore, the funds available would be less than half the amount deemed necessary to support an appropriate level of research activity in Ontario medical schools.

Comparison of projections for research support

The projections put forward in *Medical Research in Canada* are approximately three times greater than those of either the Royal Commission on Health Services or the Bladen Commission. Both Commissions undoubtedly were strongly influenced by past patterns of research granting, whereas, the most recent report was an attempt to survey actual need. To rectify the difference, federal support for direct costs of research would need to be increased three-fold over the present level. This would involve a major change in federal granting policy. Failing such a change an alternative source of support would need to be found and the additional sum required by Ontario medical schools over and above what can be expected to be available under present arrangements would increase to about $20 million in 1969–70.

Responsibility for support of research

At the present time federal government agencies assume primary responsibility for the support of medical research in Canada. Research activity, however, is an integral part of the programmes of medical education and health care, and if the quality of these programmes is at stake it is logical for the province to be vitally concerned with the support of medical research. Without this support the chances of Ontario medical schools attracting and retaining top teachers and medical scientists are reduced, and the opportunity to develop strong training programmes for graduate students is seriously handicapped.

Indirect costs of research

The high indirect costs associated with scientific research have been documented in studies at Canadian medical schools. As recommended in the Bladen Report, all federal government research grants to universities should carry with them a 30 per cent supplement as an unconditional grant to the university.

EFFECTS OF MEDICARE ON MEDICAL EDUCATION

Supply of patients for teaching

Undergraduate and postgraduate training in clinical medicine are the areas of health science education most likely to be adversely affected by universal health insurance. In the past medical education has been associated largely with the care of indigent

patients. With the introduction of the Ontario Medical Services Insurance Plan in July 1966, virtually all patients will be "private" patients and the supply of patients for clinical teaching might be expected to diminish. It is most important that patients should not be discouraged from attending teaching hospitals by poor accommodation, by loss of effective liaison with their private physicians, by inconvenience of participating in the teaching programme, or by fear of being subjected to experimental studies. To appeal to the public the teaching centre must exploit its reputation for the highest quality of professional service and must offer special aspects of investigation and treatment which are not provided in other community hospitals. A supply of ambulatory patients and contact with the community must be maintained directly through efficient emergency and out-patient services and indirectly by appointment of practising physicians to the part-time staff.

Clinical teaching units

Since every patient represents a potential source of income under Medicare, there may be unwillingness on the part of outside or part-time physicians to refer patients and, in hospitals not controlled by universities, there may be a tendency to encroach on the facilities for the teaching services. It is essential to preserve all or a portion of the in-patient and out-patient services of the teaching hospitals for undergraduate and graduate medical education under the direction of staff appointed jointly by the university and the hospital. For effective clinical teaching the Association of Canadian Medical Colleges has proposed that there should be not less than 10 in-patients for each final year medical student and at least one new consultation per day for each student taught in the out-patient department.

NEW ADMINISTRATIVE RELATIONSHIPS FOR THE HEALTH SCIENCES

In the Universities

Separation of health sciences

The co-ordination of health sciences within the university has resulted in the appointment of a senior administrative officer responsible for this area at three Ontario universities. The current tendency to separate the management of the health sciences from that of the remainder of the university may be justified on two grounds. First, the health sciences must have special orientation to the needs of the community since the teaching hospital and

ambulatory care facilities are identified with health service as well as with education and research. Second, the differences in the mechanism of financial support for capital and operating budgets of the health sciences both at provincial and federal levels warrant separate identification of these requests in the university submissions to government. However, if these forces are permitted to cleave the health sciences from the rest of the university, much of the impact of university resources and influence will be lost at a time when it is most needed by the health sciences.

Co-ordination of requests for financial support

In the past individuals, departments, schools, faculties, or hospitals engaged in health science projects applied independently to the several agencies of government for financial support of capital programmes, operating expenses, and research. The need to co-ordinate requests was obvious, and in 1965 the Ontario universities engaged in health science education proposed that all submissions concerning teaching and research programmes in the health sciences, including those based primarily at affiliated independent hospitals, should be forwarded to government through one channel for that university.

With Government Agencies

In February 1966, at a meeting called by the Ministers of Health and University Affairs, representatives of the five universities engaged in health sciences were acquainted with government plans for the development of health resources and manpower in Ontario. The Ministers stressed the need for co-ordinated effort between the various agencies of government, and it was indicated that the Minister of Health would have primary responsibility for planning and development of resources for health science education. A Senior Co-ordinating Committee representing the Departments of Health and University Affairs and the Ontario Hospital Services Commission, and with the Deputy Minister of Health as its Chairman, was authorized to set up appropriate administrative arrangements to review the plans and needs of each university, first in medicine and subsequently in the other health disciplines and to formulate from these submissions a provincial pattern for the development of the health sciences in Ontario. These arrangements provided for the first time a co-ordinated mechanism of government for regular consultation with both educators and those concerned with providing health services to the community.

Senior Co-ordinating Committee

Ontario Council of Health

At the same meeting an Ontario Council of Health was proposed with the Deputy Minister of Health as Chairman and with representatives of the health professions, public bodies concerned in health matters, and the Chairman of the Ontario Hospital Services Commission among the membership. The terms of reference were not defined but might well include the planning council for health related professions proposed earlier in this report.

SUMMARY

In contrast with modest growth of health science education during the past five years, enrolment projections of Ontario universities for the next decade indicate a major increase in undergraduate programmes in medicine, dentistry, and nursing and a four to five-fold increase of graduate studies in the health sciences. The increases in existing programmes appear to be appropriate to the requirements of the province, but new and different university courses in medical social work, clinical psychology, and rehabilitation medicine are needed. The most urgent responsibility for universities is the development of graduate student training to prepare teachers, scientists, and professional leaders. If suitable applicants are to be found for the expanded programmes, a new level of undergraduate and graduate student aid will be required.

Rapid but orderly progress in the development of urgently needed health manpower and training facilities can be achieved only by close collaboration between the educational institutions and agencies of government responsible for this field. Individual universities must consolidate the administration of health science programmes on campus and in affiliated hospitals and work closely with other universities and the Senior Co-ordinating Committee of the Departments of Health and University Affairs in evolving a rational pattern for the province.

Ontario universities cannot satisfy the demands of all the health professions for all levels of education without overwhelming the limited resources now available. Universities should establish priorities with respect to the type of professional and technological training programmes which they sponsor and the objectives of these programmes. To avoid duplication, planning should be co-ordinated among the various universities and between the

universities and Colleges of Applied Arts and Technology. Establishment of a provincial planning council for health related professions would facilitate decisions on the types of training programmes required and the most advantageous location for non-university programmes.

Simultaneous expansion of health science facilities at Ontario universities will create, between 1969 and 1972, a major demand for teachers and scientists. The success of the programmes will be jeopardized by a critical shortage of staff unless the universities are encouraged to build up staff now as rapidly as possible and expand their graduate student programmes. To permit this, government must provide generous support for research, scientific equipment, and professional training grants and give assurance of long range support of operating expenses.