Health Research and Graduate Education

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There is little doubt that society today will not tolerate science as an activity to be carried out in isolation, but requires it to be part of an integrated effort to make the world a better place. Despite the spate of arguments about the nature of science and the role of scientists, in Canada, as in other democratic societies, the elected representatives will give scientists their 'marching orders'. Canada has established a number of committees that have presented reports (1969, 1970, 1971) on the future arrangements for the development and support of research, including health research. Recently, a Minister of State for Science and Technology was appointed and we are now engaged as a nation in attempts to establish policy and priorities for support in all research areas, including health research.

The provinces, as well as the Federal Government, are involved in the support of health research, and the Province of Ontario has a Health Research Committee (Ontario Council of Health, 1969). The concern of the provinces is due to a number of factors:

1. They are responsible for health services and education, both of which are almost entirely supported by government funds;
2. They control the resources for development of new facilities, including those for health research in this university;
3. They have an increased need to establish an effective research and planning function in their ministries of health.

The total amount of money provided for health research in the Province of Ontario is of the order of 35,000,000 dollars p.a., the portion provided through the channels of the Provincial Government being approximately 17,000,000 dollars p.a.

In the health research sector the main concern of both governments is the lack of applied research that would remove the constraints on the provision and use of existing medical technology, and research aimed at increasing the efficiency of the health care system. In the Province of Ontario 58 per cent
of the total health research effort is in basic biomedical research, 26 per cent in applied health, and 7 per cent in developmental research.

The education of graduate students, closely linked to research, is also caught up in the pressures for change in the extent and emphasis of health research. We have been criticised for the lack of relevance in our graduate programmes and for turning out too many individuals in the restricted disciplines with little ability to adapt to the changing needs and opportunities in society.

As a new medical school we were in the position to organise health research so as to take into account many of the above points and to create a structure that would be strong, but capable of changing direction when appropriate. In addition, we wished to be able to develop health research policy and priorities from the standpoint of our own community and, hopefully, to have these views transmitted to Provincial and Federal bodies.

**COMMITTEE ON SCIENTIFIC DEVELOPMENT**

One of the objectives agreed upon soon after the establishment of the Faculty of Medicine at McMaster University was to ‘establish research programmes at various levels—fundamental biomedical research—clinical and applied investigation—operational research on health care as a guide to educational programmes and the use of scarce health personnel’. It was recognised that it was necessary to achieve a close relationship between programmes in health education, health services, and health research in the Faculty of Medicine and those of other health professions, particularly in programmes related to the health care delivery system and efficient management of our resources. To achieve this and to be in a position to respond to the challenges from governments, the Faculty recognised the need to establish an organisation which would attempt to identify the goals and execute research in the Faculty of Medicine in a collective manner and give priority to objectives of the Faculty of Medicine over those of its constituent departments and sub-groups. The Faculty therefore established the Committee on Scientific Development (CSD), appointing its ten members from which are elected a chairman, vice-chairman and executive secretary. The chairman, or his deputy, sits on the Executive of the Faculty and holds a position equivalent to that of Associate Dean (Education). The executive secretary attends meetings of the Faculty Executive and Council but has no vote; he also sits on each of the sub-committees of the CSD. The CSD exists to ensure that things happen, to encourage excellence by the allocation of resources and not to hinder research in the Faculty of Medicine.
There are a number of sub-committees of the CSD which are concerned with resource allocation or management. These cover the following areas:

1. Equipment (Sub-Committee for Co-ordination of Laboratory Equipment, SCOLE),
2. Space,
3. Central facilities,
4. The Dean’s Fund.

They report to the CSD but have the day-to-day responsibility for administration along the guidelines established by the CSD. The CSD reports to the Faculty Executive and Faculty Council on activities in all these areas, and on grant support to all individuals in the Faculty, so that each year the Faculty resources committed to health research, the nature of the programmes, and their achievements can be reviewed.

**Research Programmes**

A research programme has to be related to a general problem in human biology and health; it should be characterised by as broad a spectrum of interests as possible and should involve multiple departmental and other resources in its formulation and execution. The execution of the programme should involve synergistic relationships with other programmes in education, service and research. Our policy is also to support independent research, defined as research by an investigator who is not primarily related to other programmes in the Faculty of Medicine.

Programmes may be developed by a group of individuals in the Faculty with common interests. The proposed programme is then reviewed by the CSD, which considers the resource commitment in terms of personnel, space, equipment, the strength of the individuals as scientists, the degree to which the members have common objectives towards which they are prepared to work, and the relevance of the proposed programme to the goals of the Faculty of Medicine. Since the CSD is concerned with overall scientific development it can recommend to the Faculty of Medicine areas in which new research programmes should be developed. All recommendations are reviewed and discussed by the Faculty Executive and Faculty Council and their approval is required before a programme can be instituted. In this way, the Faculty is kept aware of the commitment of its resources for health research. If a new programme is approved in an area that has little or no staff, it means that the Faculty is prepared to commit resources for the recruitment of staff to establish the programme, as well as making available the necessary space.
Each programme has a director who is responsible with his senior colleagues for its overall scope, quality and integration. The programmes are reviewed by the CSD, Faculty Executive and Faculty Council two years after their start and at three-year intervals thereafter. The members of the programme make their own arrangements about pooling their resources. A member of a programme is not permanently committed and, in terms of his career development, is responsible to his department chairman. Thus, if an individual's research interest changes or he finds his colleagues and/or programme director unacceptable, he may leave the programme. Since the department chairmen comprise the Faculty Executive, they would soon be aware of the limitations of a programme director who could not fulfil his function as a leader. Conversely, if a chairman was interfering with the function of a member of his department in a research programme, the member could bring this to the attention of the chairman of the CSD, who sits on the Faculty Executive; and if the departmental chairman was behaving inappropriately he would be subject to the discipline of his colleagues. This is in keeping with the matrix management philosophy of the Faculty of Medicine.

There was anxiety lest the power of the committee should be too great and individuals' research careers might be jeopardised if they should engage in work contrary to the goals of the school. The power of the CSD only reflects that of its parent body, the Faculty Council, which has a duty to determine areas where growth should be encouraged and where expenditure is unprofitable. The important role of the CSD is to advise in these matters, but programme directors have the right of direct appeal to the Faculty Executive. At no time does the CSD attempt to supersede the granting agencies in deciding whether or not research is scientifically worthy of support. In so far as the committee has power, it is the power to acquire and distribute information about research to the Faculty and its executive. In addition, it can formulate priorities and objectives for the Faculty, which can advise the appropriate federal and provincial government granting agencies on the development of policy. The committee also conveys information to members of the Faculty about changes taking place in provincial and federal health research policy.

The role of the programme director is important to the operation of research programmes in the Faculty of Medicine. He is responsible for the scope and quality of the research programme, for the management of resources, and for co-ordination with other programmes in research, education, and service. He must be committed to the programme and have the ability to remove obstacles to the scientific progress of its members. He does not, however, directly control the research of members of the programme, but
attracts and selects persons likely to be capable of working compatibly with a broad range of interests and who have the personal security necessary for co-operative research interests. The selection of problems to be worked on should be reached by agreement among the investigators involved. In the final analysis, a programme director’s power rests on the respect the members of the group have for him as a scientist. If he fails as a leader, the Faculty Executive may have to replace him when it reviews the effectiveness of the programme. In arriving at such a decision, the Faculty Executive has lines of communication through the Committee on Scientific Development and through the department chairmen.

The programme director is responsible, in consultation with senior members in his group, for making decisions about the suitability of an individual to maintain a research career. He must also ensure that the quality of grant proposals and manuscripts submitted from his group are of a high standard. The director, in collaboration with his senior colleagues, has to make recommendations through the CSD to the Committee on Promotions and Tenure as well as keeping the appropriate department chairmen informed. Since departmental chairmen play a major role in the career development of their staff, they must be kept fully aware of what each member of their department is doing in research programmes.

COMMITTEE ON GRADUATE CURRICULUM AND POLICY
It has been customary for the basic science departments—Anatomy, Biochemistry, Microbiology, Physiology, Pharmacology and Pathology—of most medical schools in Canada to establish graduate programmes leading to higher academic degrees. The clinical departments in most medical schools do not offer programmes leading to academic degrees but tend to concentrate their postgraduate programmes in the clinical sub-specialties leading to the higher professional qualifications of the Royal College of Physicians and Surgeons of Canada. Graduate programmes in Clinical Epidemiology and Biostatistics, particularly in relation to applied, developmental and operational health research, are very inadequately developed. One of the major problems faced by medical schools in Canada has been the shortage of qualified academic personnel to staff the new medical schools and the expanding existing institutions. This has made Canadian university medical schools dependent upon staff recruited from elsewhere in North America and from abroad. It was recognised that in order to attract suitable academic staff it was important to provide programmes in graduate education in which an integrated approach in the pre-clinical, clinical and community components of health care could be developed. The weakest areas of graduate studies in Canadian
medical schools are in the clinical departments and in community health. The Ontario Council of Health commented: ‘if adequate programmes are not established in these areas to develop the kinds of personnel who can conduct competent health research programmes in the development of health care delivery systems and efficient methods, prevention and treatment will be seriously impaired in this province’.

Among the factors interfering with the development of effective graduate programmes in the Faculty of Medicine in the Health Sciences Centres have been the training regulations in professional organisations such as the Royal College of Physicians and Surgeons of Canada; the attitude of the graduate schools in universities towards the development of integrated programmes in clinical departments; the financial arrangements for the training of personnel; the restrictive attitudes of university medical schools, schools of nursing, schools of dentistry, schools of pharmacy and other schools in respect to the employment of individuals capable of conducting adequate programmes in health science.

If an individual is to work effectively in programmes related to cell biology, he not only needs experience in biochemistry, but must also have a knowledge of biophysics, genetics and cell biology. He can best acquire this in an integrated graduate school programme. Similarly, a nurse taking part in health research not only needs nursing experience but also to understand the nature of health research in the field she wishes to explore. Furthermore, the cost of higher education is of great concern to governments, and resources must be used to the best advantage. In view of these and other considerations, the Faculty of Medicine has agreed that the most feasible solution is to establish multidiscipline graduate programmes in health research.

In the design of facilities and recruitment of staff for the new Faculty of Medicine at McMaster University the school gave prime consideration to providing an ideal environment for the development of research and graduate training in health sciences. The presence of the University hospital on the campus, physically connected at all levels with the research and educational facilities of the medical school, provides a unique opportunity for a close working relationship between the staff, the community clinical and non-clinical areas and other University departments, and this permits the full scientific resources of the medical school to be focused upon problems in human biology.

In order to allow maximum flexibility in terms of staff, resources and opportunity for the students and to achieve the objectives discussed, we have established a graduate programme in medical science. This is, in effect, a graduate division of the Faculty of Medicine. The programmes have been developed
in conjunction with the research programmes and they provide a base for a broad experience in human biology for graduate students while at the same time ensuring they get the in-depth training necessary for a scientist.

Students in one programme may take courses provided in another, and in addition we are trying to ensure that the graduate students enrolled in this programme are given the opportunity to take part in the undergraduate educational programme.

We have established three areas of study within our graduate programme:

1. Growth and Development,
2. Blood and Cardiovascular Systems,
3. Design, Measurement and Evaluation.

We are currently considering the establishment of a programme in Neurobiology. In addition, associate members will come from other departments such as anatomy, paediatrics, pathology, biochemistry, and clinical epidemiology and biostatistics.

Each area is responsible for the scope and quality of its programme and for its graduate students. All programme areas are subject to review by the Graduate Curriculum and Policy Committee and ultimately by the Faculty Council as well as the Graduate Committee of the University. The regulations governing graduate students are those of the university, but we are allowed considerable flexibility in selection so that we may take into our programme students with diverse backgrounds. For example, course requirements can be waived if the individual has already demonstrated competence in an area.

The main objective of this programme is to encourage the student to develop a broad understanding of health problems and to recognise the relationship of his special field of interest to other areas. While we do not expect him to become an expert in those areas, it is hoped that by recognising what each represents he will be in a position to know where he should turn for help when his own research requires new techniques. By providing the student with a broad exposure to problems in the health field, particularly in human biology, and by establishing effective programmes for him, we hope to produce individuals with broad concepts capable of independent thought who are able to contribute effectively to the study of problems in society.

References
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