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# August 1973 Special Study No. 29

# Health Care in Canada: A Commentary

by H. Rocke Robertson

August 1973



# Health Care in Canada: A Commentary

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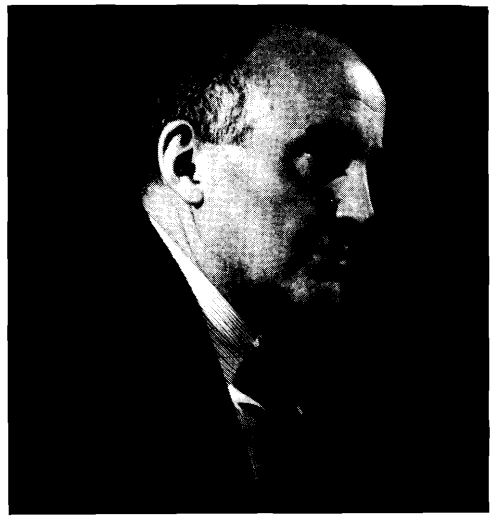

Canada Wide Photo

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## Foreword

The diverse problems of health care have been under active discussion for many decades in Canada and several other countries. The growing trend towards increasing availability of, and social responsibility for, health care has been a common denominator in much of such discussion. I hope we are entering an age when action will go with words. Few fields, in some respects are more alive with minor experiments and major changes at all levels of our social structure and, in other respects, so fraught with inertia. Every overview of the structure and financing of health care in Canada has been obsolete to some extent before it was published. New problems are arising as old ones are alleviated. The participation of the public in the discussion needs to be expanded.

The Science Council of Canada was concerned with the role which science and technology was playing and could play in the field of health care and decided to carry out an investigation. The Council's Committee on Health Sciences invited Dr. H. Rocke Robertson to be the leader of a study group which would prepare the background study published in this book. The opinions presented in this study are, of course, those of the author and do not necessarily reflect the views of the Council. Without committing themselves with respect to their individual agreement with the statements and conclusions in the study, the members of the Health Sciences Committee, on behalf of the Council, approved it for publication in the belief that it will make a significant contribution to the present discussions of the direction for further development of health care in Canada.

To keep this background study to manageable proportions much valuable statistical and tabular material was omitted. This is available in the Council's archives for any research worker who wishes to consult it.

The Council is greatly indebted to Dr. Robertson and those who worked with him for the painstaking job they have done in a most intractable field.

P.D. McTaggart-Cowan,
Executive Director,
Science Council of Canada.

## Author's Preface

Early in its history the Science Council of Canada declared its interest in health and outlined as the elements of the goal in this area, "the provision of medical services of rising quality and efficiency; the improvement of the environment in which Canadians live; and the development and improvement of practices conducive to public health".

At its meeting in September 1969, the Science Council established a Health Sciences Committee with the following general terms of reference:

"To inquire into the use of science and technology in the Canadian Health Industry and, through this, to examine the purpose and the priority of health science research, and in particular to examine and make recommendations on:

(a) The over-all level of research activity in the health sciences considered in relation to national objectives and priorities;

(b) The relative levels of research in the principal sectors of the health field and their adequacy or appropriateness in terms of the particular needs and opportunities of the sectors concerned;

(c) The broad principles and policies which govern the allocation of public funds for research in the health sciences;

(d) The organization and mechanisms for administering these funds."

### Interpretation of Terms

Clearly these terms of reference could be interpreted in many ways. As the Committee set about its task, it was inevitable that discussions should have taken place around the question of the meanings of "science and technology" (How does one *use* science? Where does it end and technology begin? Is it entirely separable, in the health field, from art?); the extent of the industry (Is everything conceivably related to health to be included – for example, housing, pollution, poverty, forensic medicine, biochemistry – if not, where is the cut-off point?); the concept of adequacy and appropriateness (Can research ever be called adequate so long as a problem exists? Can there be such agreement on priorities that one can rule on the appropriateness of research?); and, of course, what is research (How organized and how "scientific" must an investigation be before it qualifies as research?).

To adopt the most liberal interpretation of each of these and other points in the terms of reference, and to try to cover the whole, would be to assume a task of unmanageable proportions: thus it was decided in discussions between the Health Sciences Committee and the Study Group to confine the initial study in one way or another and it was evident that in the process many arbitrary judgments would have to be made.

### Definition of the Task

In setting out to determine what might usefully be done, it became apparent at once that the first move should be to review the national objectives in the health field. If these are nowhere clearly stated as such, at least some of them have been set forth in Reports of the numerous Commissions,

Committees, Conferences and Task Forces that have been assembled in recent years to study the health problems in Canada.

These groups, of widely varying compositions, all took a wide-angled view of the health scene, and while their emphases are different, there is an extraordinary degree of agreement on the major points. All had very much the same faults to find with the present system and agreed that it should be modified to become comprehensive, co-ordinated and more efficient. On no point of importance, so far as we can judge, was there disagreement within or between the groups. **Thus we have assumed, at the outset, that a national objective, basically a comprehensive and co-ordinated system of health care, has been set.**

Obviously there are other national objectives in health, the attainment of most, but not all of which, are dependent upon the development of a "system", but, for practical reasons, an early decision was taken by us and confirmed by the Committee, to confine our attention to the objective that seemed to be foremost in everybody's mind and, indeed, appeared to us to be of overriding importance in the present state of development in the Health Field.

One further step was necessary to define our position. **Health Sciences Research** as we see it embraces three main areas: *Biomedical*, which includes all research into the biological functions and disfunctions relative to medicine; *Health Care*, involving questions of the organization and functioning of the health care system, its quality and its costs, etc.; and the *Social Area*, dealing with the factors in society that influence people's health or their access to care.

By our decision to limit our inquiry to research related to the development of a comprehensive and co-ordinated system of health care, we set aside Biomedical research from our immediate consideration, and finally took as the **purpose of our study to examine the overall level, adequacy and appropriateness of research related to the development of a comprehensive and co-ordinated system of health care.**

**The Approach**

In order to be in a position to make some judgment on the adequacy and appropriateness of the research, we first reviewed the present situation to determine in so far as possible the standard of health care in Canada and to note the strengths and weaknesses of the system.

Our next step was to collect information on the research being carried out in this field. Much of this information is reproduced in the study. Inevitably we have been drawn into areas that lie outside even the very generous limits of research that we set for ourselves and, doubtless, we have commented on subjects that might properly have been excluded. We make no apology for having lost ourselves at times in the maze of problems that comprise the health care system.

At every turn we were confronted with the question, what is Health Care Research? Our arbitrary answer is revealed by the headings under which we have grouped the various research projects*; research into the

*See Appendix 1: "Index to Research List", in the Supplementary Papers.

quality of health care; into prevention of illness and promotion of health (including studies of the environment); into the people engaged in health care; into the organization and management of people and facilities; the demands for service and, finally, that part of socio-economic research that is closely related to health matters.

We have thereby attempted to set down and present to the Health Sciences Committee of the Science Council what is known about our present system compared with what is being done to improve it. If this is a step toward judging the adequacy or appropriateness of the research, it is clearly preliminary, for still so little is really known about either the problems or the quality of the efforts to solve them.

This volume contains the main body of the study. It provides self-contained reading matter, but reference to the supporting material contained in the twelve appendices is needed for a more serious study. This material is listed in the Appendix and is available, either in parts or as a complete supplementary volume, *Health Care in Canada: Supplementary Papers*. Requests for this material should be addressed to the Records Office of the Science Council of Canada.

30 March 1972
H. Rocke Robertson,
Leader.

J.M. Amy, M.A. Kasowski, L.B. Pett, C.L.R. Unwin,
Members of the Study Group.

## Acknowledgements

Throughout the whole process of defining the problems and developing the plan for the study, the Chairman and Members of the Committee on Health Sciences have been most helpful to us. Further, during and between the frequent meetings with the Committee, their criticisms and suggestions have been of enormous help to us in preparing the study. If we ot the Study Group are entirely responsible for the opinions expressed, we are no less grateful for the assistance and guidance that the Committee Members have provided throughout.

We, the members of the Special Study Group also wish to express our appreciation of the assistance afforded by the Science Advisers, Dr. Pierre Bourgault and Mr. Jorge Miedzinski with whom we have worked closely and who have helped us at every turn. Our thanks are also extended to the Executive Director of the Science Council, his Administrative and Library Staff who have never failed to provide us with excellent support and to Mr. Douglas Nesbitt for his conscientious efforts. Finally to Mrs. Helen Routliffe and Mrs. Lois Baker, we offer out thanks and admiration for the cheerful and efficient manner in which they have dealt with the secretarial tasks with which we persistently overloaded them.

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# Main Conclusions

**Chapter I: The Quality of Health**

**1.** The objective of a first class system of Health Care cannot be reached unless there is sufficient information for proper planning and assessment of results.

**2.** Canada's performance in the Health Field as shown by international statistics on life expectancy, maternal and infant mortality is relatively poor.

**3.** While significant, this information is not nearly sufficient for planning and assessment. There is a lot of available information in hospital and medicare records which, brought together, could be very useful.

**4.** Further important information could be obtained by systematic health surveys of the Canadian people.

**5.** Research is required to identify and develop ways of obtaining data that will increase the capacity for measuring the quality of health.

**Chapter II: The Quality of Health Care**

**1.** The reasons for measuring Quality of Health Care are:

a) Only if it is known how well people are being treated can there be progress: "... the process of improvement, starting with the spotting of faults and leading to the planning to correct them; the setting of targets and the judgment as to whether or not they are being reached, depends, ultimately, upon measurement."

b) To improve the quality. The fact that a careful check is being kept on work is a stimulus to good work. Faults can be discovered and corrected quickly.

**2.** The assessment of the quality of work of an individual or institution is complicated, and involves a number of different people and groups (for example, Government, Hospitals, Hospital Associations, Hospital Accredition Council, Doctors). It is only likely to be carried out well if a single organization in each province is given the responsibility and the authority to bring the various interests together, to work out assessment techniques and to implement them. The position of the Colleges of Physicians and Surgeons in this respect is not spelled out clearly in the Medical Acts. We recommend that it should be: that they be charged with the responsibility of assessing and enhancing the quality of medical practice.

**3.** Present ways of measuring Quality of Health Care are incomplete, laborious and probably imprecise. They should be co-ordinated and refined. Research into better methods is needed.

**Chapter III: The Quality of the System**

**1.** An important step toward the goal of improving the health of the people is the development of an efficient, comprehensive and co-ordinated system of health care. This will be only partly effective if the social and environmental faults that undermine health are underplayed.

**2.** Ways of determining how the "system" of health care is working must be developed.

**3.** This can only be done by detailed examination of regions, primarily from the point of view of the service the individual receives, but also from the point of view of health professionals and the people as a whole.

**4.** "Reasonable expectations" are not met in:

a) Ease of access.
b) Co-ordination of facilities.
c) Continuity of care. (In particular, lack of continuing care facilities.)
d) Efficiency.

We recommend that more nurse practitioners be trained to help meet some of these expectations.

The system lacks incentives to excel.

The rapidly increasing cost of health care is disturbing.

**Chapter IV: The People Involved in Health Care**

**1.** The general attitude to change in the Health Care System is favourable. There are important inhibitors but there is a ferment of activity that could be effective in bringing about improvements.

**2.** There is a remarkable change taking place in teaching in the Health Field. While the general trend is good there is a danger that the popular downgrading of scientific medicine will harm the centres of excellence and, eventually, the quality of care.

**3.** There is increased appreciation of the importance of continuing education. A promising start toward organizing it has been made. There is still much work to be done to determine the best ways of continuing the education of all health workers.

**4.** To assure, in so far as possible, the maintenance of a high level of competence of health professionals, their work should be examined periodically. In the case of doctors this examination should consist of a review by a Board, the constitution of which is agreed upon by the Government and the College of Physicians and Surgeons, of the data available from hospital and office records. This method should be used pending the development of a more refined technique. Where, by this means, doubt is cast upon an individual's competency a thorough examination should be carried out.

**5.** Because of the lack of information on the present situation in Health Care and the uncertainty about the future, it is difficult to predict manpower requirements. Almost certainly there will be a requirement for more doctors. Our dependence on graduates of foreign schools is dangerous and unfair. The anticipated needs are not certain enough to warrant the opening of new Medical Schools, but they are sufficient to justify expanding the output from existing schools to the maximum.

**6.** Experienced nurses have shown in industry and in the North that they are fully competent to carry out the tasks normally associated with the "Expanded Role". Plans to train increasing numbers for this role should be encouraged.

**Chapter V: Organization in the Health Field**

**1.** Besides the continuing importance of the Federal role as co-ordinator, stimulator, convenor, etc., there is a great need for continued Federal involvement in Health Sciences Research Funding and in the maintenance of uniform standards for each profession and technology.

**2.** Hospital overloading is the key symptom of an organizational

disease. It can only be relieved by the provision of co-ordinated diagnostic, ambulatory and continuing care facilities.

**3.** Regionalization of complicated services is difficult to effect, but it is necessary in the larger provinces for the planning and operation of a good health service.

**4.** The process of introducing a regional system is more likely to be successful if it is gradual: It would make sense to start with the co-ordination of hospitals and proceed through the regionalization of certain government and clinical services, continuing education and quality control toward a full regional system.

**Chapter VI: Cost and Management**

**1.** Health costs are continuing to rise and now amount to a sizable proportion of the Gross National Product and of personal expenditure.

**2.** The amount that should be spent on health relative to other costs is not known. At present Health Care is low on the list of average Canadian personal expenditure.

**3.** To the extent that inefficiency or extravagance exists people are not getting their money's worth.

**4.** The information on efficiency and extravagance is limited but undoubtedly there is ample room for improvement. Serious efforts are being made to increase efficiency especially in hospitals.

**Chapter VII: Computers in the Health Field**

**1.** Canadian Governments and Hospitals are making extensive use of computers in the Business Management aspects of the Health Field.

**2.** The use of the computer in operational research, scheduling, medical information, and Major Systems Management is still limited to research and development trials.

**3.** Clinical applications of the computer are still very limited.

**4.** The potential benefits from the application of the computer to all aspects of the Health Care System are enormous. Development of techniques is difficult and expensive. It should be concentrated in a few centres of excellence.

**Chapter VIII: Prevention and Promotion**

**1.** The prevention of certain infectious diseases and the general public health measures are well handled, but many disabilities and illnesses that might be prevented by the individual's action, or discretion, are uncontrolled.

**2.** Research is required to find better educational methods.

**3.** Screening is useful in certain specific instances. It is of unproven value for general application. One of the greatest fields of promise is in the pre- and post-natal period.

**4.** "If a better way of life is the only ultimate solution to the problems of health, so far we have only seen the first glimmer of recognition of the sorts of things that might be done or tried to achieve it." Tangible results are a long way off.

**5.** An important factor in the promotion of health is the ease and the quality of contact between the individual and the health services.

**Chapter IX: Research in Health Care in Canada**

**1.** Health care research involves many disciplines. Its importance has only recently been appreciated. The training of researchers in this field and the opening up of interdisciplinary channels has just begun.

**2.** On the basis of suggested criteria, the funds for Biomedical research are inadequate. Funds for Health Care Research, sufficient for the moment, must be rapidly increased as more research workers complete training.

**3.** It is important that:

a) Research support come mainly from federal sources.

b) The development of a research field be carried out by a non-political body dedicated to research.

c) Government departments have the means of supporting research and trials in areas of particular current importance or sensitivity.

**4.** The need for and the feasibility of Health Care research has been demonstrated. Its development should be entrusted to a Health Care Research Council.

**5.** The Health Care Research Council should be responsible to the same Minister as all the other Research Councils.

**6.** The benefits of Biomedical Research in terms of discovery, education and practice are established. Canada's contribution has been important. The potential benefits of Health Care Research are great.

**7.** The buildup of research manpower has begun.

**8.** A review of the research and trials in Health Care leads to the conclusion that they are inadequate.

# Introduction

The central question raised by our terms of reference is: What progress is being made toward the development of a good health care system? In seeking an answer to it we have consulted the numerous reports and publications on the subject that have been produced in Canada in the past few years; interviewed a large number of people in government offices, universities, hospitals, professional associations and elsewhere; and compiled and analysed a list of research projects in the field of health care during the year of our study.

In spite of the breadth of our search and the openness with which we have been received everywhere, we cannot claim to be in a position to give anything like a precise answer. We can do no more than say that we have seen a number of very encouraging signs of progress.

The stage for the development of a good system is set by the two huge steps that have already been taken; Hospital Insurance and Medicare are both, by now, well established across the country. The governments (Federal and Provincial), educational institutions, professions and the public are all poised for action, and if there is great uncertainty as to what the action should be, there is an attitude abroad that is conducive to change. But whether or not real progress will occur depends upon the outcome of a number of issues of which four have appeared to us to be of particular importance: Cost and Quality, Supply and Demand, Public and Non-Public Endeavour, and Drive and Inertia.

**Cost and Quality**

In practically every country in the world there is concern about health care. As the expectations of people rise and as Medicine becomes more complex, the tasks of providing care for everyone and of paying for it become increasingly difficult. Cost is perhaps the more obtrusive problem in the eyes of the governments. Indeed, a point has been reached in several countries where rising health expenditures are regarded by the government as one of the most serious economic challenges that it has to face. Not only, in most cases, is the actual rate of increase alarming, but it is disproportionate both to that seen in several other forms of social investment and to the so-called productivity of the health care system.

If costs are important, the quality and quantity of care are more so; and there is certain to be constant competition between the demands for cost control and those for the improvement of health care.

To some extent these two forces are compatible, for there are efficiencies that can be effected which achieve both a reduction in cost and an improved service. But all too often the relationship between cost and quality is direct; it usually costs money to improve quality, and the decision to adopt a course of action that will cut costs can never be taken lightly for fear that it will cut quality as well.

It is in this latter connection that the encounter between cost and quality is raised most acutely. It is possible that, for instance, excessive zeal to reduce costs will diminish the quality of care; or that unreasonable claims for the preservation of quality will lead to conflict that will interfere with progress. It is also possible that the machinery now being developed to control expenditures will cost more than it saves.

We have given first place to a discussion of the quality of health of the nation and the quality of care available to its people for these, in our view, are unquestionably of prime importance. There is some danger that the excitement over rising costs may lead to a setting aside of some of the claims for quality, so few of which, unfortunately, can be substantiated or refuted by fact. Undoubtedly some of them are false, but equally clearly most are thoroughly sound and, in the body of the study, we have made special pleas for the maintenance of quality where we thought it was in danger of being sacrificed to an economy that, in the circumstances, could only be false.

It must be admitted that our opinions here are based on what we think we have learned from experience and what seems, for a variety of reasons, to be sensible. There are practically no facts upon which to make a decision in a tussle between cost and quality; the need for objective ways of measuring quality is very great. While no one knows precisely how or what to measure in order to be able to judge quality accurately, there are presently available scattered bits of evidence which, if brought together, would provide a useful start. We have urged that this be done and that research into the ways of assessing quality be encouraged.

To place the accent, as we have done, on quality, is in no way to ignore or even to underrate the importance of the cost factor. When Hospital Insurance and Medicare programs were finally established across the country the costs of operating hospitals and paying doctors became, for the first time, easy for everyone to see. Their sum is staggering and it has mounted at an alarming rate in the past few years. The question is naturally raised – how much should be invested in health? Is 5.5 per cent of the Gross National Product (GNP) too much or too little? Should the average individual be willing to devote more than 6.35 per cent of his personal spending on health care when he spends twice as much on transportation? Before these kinds of questions can be answered there is much to be learned in the area of cost-benefit analysis in matters of health and in the setting of priorities. Meanwhile, there is the enormous task to be done of eliminating extravagance and costly inefficiency wherever possible.

It cannot be hoped that the arguments between cost and quality will ever be resolved; but they can be refined, at least, to the extent that knowledge about quality assessment is increased. Until methods of measurement are developed, the decision makers will be groping in the dark and their arguments will continue to be based on emotion and prejudice.

**Supply and Demand**

The success of any system that is adopted will depend upon the soundness of the balance that is struck between the supply of care and the demand for it. If an attempt is made to satisfy all the demands that may be anticipated the system will break down in short order. Nor will the public support one that is too rigid and austere.

The demands on the hospitals, the doctors, the continuing care facilities, indeed, all the services, are not known precisely; but it is evident that with the removal of the financial barriers more and more people are seeking to avail themselves of these services. The time will come, if it has not

already arrived, when the most serious consideration will have to be given to defining the services that society is willing to provide or, to put it the other way, what the individual can reasonably expect. How quickly should he be able to see a doctor or obtain a consultation? How long should the non-urgent case have to wait for a hospital bed? How can the optimum level of care be arranged for people in outlying areas? These and dozens of related questions are facing the planners through whose minds run visions of manpower problems, the allocation of tasks, organization and management techniques, and others of the host of subjects that bear upon the issue of supply and demand as it relates to health care.

In danger of being overlooked are the facts that the ultimate purpose of the system is to attend to the health needs of the individual; that these needs are not always complicated or classifiable; indeed, that many are simple, requiring little more than contact with someone who is sympathetic and knowledgeable and who, at the same time, has the authority to set the person off on the right track in the system if something more is required.

With this thought in mind we have urged a revision of the allocation of tasks and have emphasized, in particular, the importance of encouraging the current efforts to train nurse practitioners to work with physicians in providing primary contact care.

Technology is the counterpart and the supplement of this relatively simple approach to the solution of the problem of demand. Foremost in everyone's mind in this connection is the computer which has been introduced into medicine in many capacities. To date it has established a firm place for itself in the business aspects of health care – notably in hospital administration and in accounting. The part that it will play in the realm of diagnosis and treatment is not yet clear. Nor has its potential in the management of information been exploited to anything like the extent that it might be and, presumably, will be. In the development of a health care system the rate of progress will vary with the speed and efficiency with which the handling and sorting of the masses of data bearing on the supply and demand for health services is accomplished.

**Public and Non-Public Endeavour**

Health care in Canada, as elsewhere, developed largely as a result of charitable activities and private endeavour, with the governments filling in the gaps. Gradually, but at an increasing pace, the governments' activities in the health field have spread until a point has now been reached where, without question, the role of the governments is predominant, involving the financing of hospitals and a number of other facilities, and medical practice.

Bearing in mind the original question as to the progress that is being made toward the development of a good system of health care, one has to ask how far the role of government should go. The problem is an old one and has a very general application, but at this moment in this particular field it is especially important to consider it because the possibility still remains of salvaging what is best in non-government endeavour to complement the work of the governments.

In our study we have only touched upon this problem indirectly, but

we have noted in passing some of the accomplishments of non-government endeavour in the health field: the building and operating of hospitals, the establishment of a high level of care in so many communities, the centres of excellence, the voluntary agencies too numerous to mention that contribute so much to the well being of their charges. It would be tragic if the energy and the skills that for years have been devoted to these causes were drained away. The development of a good system of care depends to a large extent upon their retention.

The challenge is to find the right combination of private and public endeavour and to engage, in a system that must become largely government controlled, the continuing interests of the kinds of people that have built it up.

**Drive and Inertia**

Nearly thirty years ago an official report[1] recommended that a comprehensive plan for health care be developed in Canada. To review the slow progress of events since then is to realize the degree of inertia that exists in social systems and to appreciate the energy that is required to overcome it. An attempt to identify the components of the inertia in this case has led us no farther than the obvious generalizations that action has been impeded by the disinclination of people generally, and of health professionals particularly, to change their ways, reinforced by the suspicion that government intervention would not improve matters. But, it should be observed, where a good case has been made, action has followed – Hospital Insurance and Medicare being the examples. That is not to say that proper planning and preparation preceded the action. In fact they did not: in both instances the years following the introduction of the new system have been characterized by serious administrative difficulties. Fortunately these difficulties have been mainly in the accounting and financial fields: they have scarcely affected the care of patients. Similar administrative faults in areas directly involving the care of people could have the most serious consequences. Thus it is to be hoped that when future moves are being planned the lessons of the past will be recalled.

It is unlikely that the components of inertia will change, but good cases for action will be made and action will be urged. Where this directly involves patient care, the only good case is one that proves that the method works. Hence the need for research and trial. The main drive should be in this direction rather than in launching untried systems.

**Research in Health Care**

The closer one examines the situation the more one realizes how little is known about the health and health care of the Canadian people – but in assessing the level of activity in health care research one cannot avoid the conclusion that it is very low relative to the size of the problem. This is not surprising. The field is new – not only in Canada but in every country – and people knowledgeable in it are few and far between. The encouraging thing that we have seen is the way that action is now starting. The universities have made great strides in bringing together teams of researchers, conducting trials, modifying curricula to make it possible for students to learn

something about health care research, and setting up graduate programs. Governments likewise are organizing and staffing their departments so that they may plan objectively. Hospitals, nurses and doctors are taking an increasing interest. There is already very considerable activity and it will doubtless grow. Its eventual effect, in so far as the development of a system is concerned, is not predictable but we can say that there have been appreciable moves made in the right direction and there is promise of more.

But, as is so frequently pointed out, to concentrate upon the care of the sick is to be, in large part, blind to the sternest realities. The greatest fault lies not in the way that the ill are treated but in the inability to cope with the conditions that lead to illness or weaken a person's capacity to withstand it. These embrace the gamut of the problems of poverty, of behaviour and of human relations; problems infinitely more complex than those of the treatment of disease. The latter are difficult enough to solve, and their solution will absorb all the talent and money that can be found for the purpose. And yet it is clear that even if the treatment of disease were as perfect as possible the battle would still be a losing one unless, at the same time, what might be called the "primary faults" were corrected.

Thus it would be well, as the current battle cry has it, to shift the emphasis from Treatment to Prevention. This need not imply that Treatment should be robbed to pay Prevention. It does, in our view, imply a change in attitude on the part of some of those in the health field whose work brings them face to face with the conditions stemming from the "primary faults". These people should bend every effort to show how social ills express themselves in physical and mental disturbances and should work in the closest collaboration with sociologists, economists, psychologists, epidemiologists, public health experts, and others in seeking and effecting solutions.

A shift in emphasis also implies increased support for research and trials in the general field of health-related social problems. We have been disappointed in our scanning of the state of the research effort in this area to find not only how little work was actually being done, but more important, how few fruitful ideas there seemed to be. It can be hoped that challenge, collaboration and opportunity, all of which have been lacking, will provide the answer.

**The Triad**

The full success of the triad of Health Promotion, Prevention and, when this fails, Treatment of Illness requires an integrated system of activities. Over the years there have been developed in this country a wealth of talent and facilities which, if properly deployed, could form the better part, if not the whole, of such a system. The essential problems are to find out how to co-ordinate what exists without weakening the points of excellence and to discover at the same time what additions are required.

The governments, universities, health institutions and professions appear ready at last to carry out the research and large scale trials that must precede the major revisions that are called for in the health care system.

# I. The Quality of Health

> "Most of the important values in life and most of its enduring qualities can only be assessed subjectively. Compassion, insight, love, creativity and beauty cannot be measured or counted. Health is surely associated positively with these attributes, if not closely related."[1]

It is true, as the quotation above points out, that it is difficult to measure health. Even taking its simplest definition (the absence of disease) one can only be vague in the assessment of health because disease itself is hard to define precisely. If, by health, something more[2] is meant – something positive, a well being, there is even less certainty.

And yet it is important to know as precisely as possible how healthy people are. **If the objective is to develop a first class system of health care, it cannot be reached unless there is sufficient information for proper planning and assessment of results.** As a first step, let us examine the problems of health measurement and review what is now being measured and what might be done.

## Health Measurement

It can be said that the quality of the health of a people is a composite of a number of factors the most important of which are as follows:

a) The genetic constitution of the population; the innate ability to withstand the stresses and strains of life;

b) The way of life; habits – eating, rest and exercise, smoking, drinking, drugs;

c) The social environment – education, affluence and poverty, competition, love, hate;

d) The physical environment – housing, the purity of air and water;

e) Health care – the preventive measures, the promotion of health, the treatment of the sick.

Health, since it is the result of these various factors, expresses itself in complex ways, often defying precise definition. If measurements are to be carried out, some decisions must be made as to what constitutes health in the individual case. Where there is frank disease, accurate assessments can be (but seldom are) made. But in a large proportion of the population there are varying combinations of complaints and physical faults that pose real problems to anyone trying to decide who is, and who is not, healthy. These problems cannot now be coped with, but there are certain important, if crude, indicators of health that can lead a long way toward providing the basic information necessary for planning – life expectancy, the causes of death and the prevalence of disease.

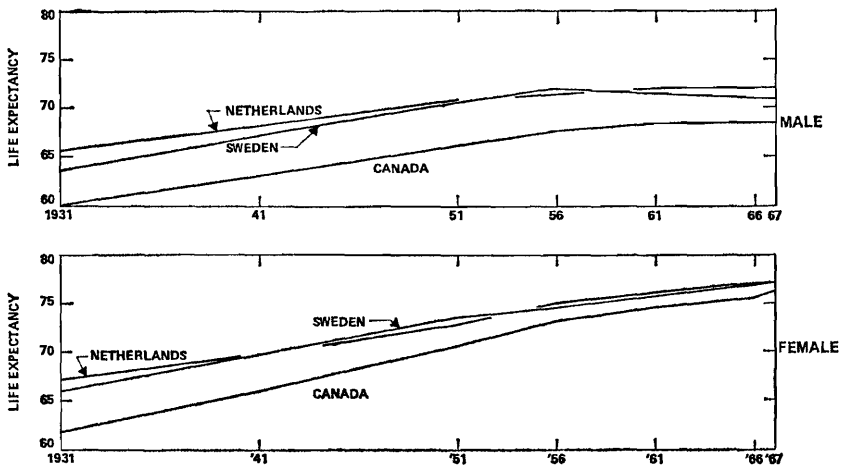
## What Measurements are Now Made?

### Length of Life

With respect to length of life information is plentiful and has been gathered over a period of many years in a manner that makes possible both national and international comparisons.

Figure 1 reveals the record – a steadily increasing expectancy of life at birth for both males and females which by itself indicates progress. It is to be noted, however, that in some other countries the expectancy of life is longer. In Sweden and the Netherlands, which are usually in the lead in health statistics, the expectancy for females is approximately one year greater and for males approximately two years greater. Canada's relatively poor showing cannot be ignored. Nor, as in any other international "health competitions" in which Canada usually fares worse than it should, can it be attributed to the fact that the health statistics of our indigenous peoples – the Indians and Eskimos – are poor. Indeed they are poor[3], but because the populations are relatively small the influence that figures derived from them have on the national statistics is inconsequential.

**Figure 1–Life Expectancy at Birth in Canada and Two Leading Nations**




*Sources: United Nations Demographic Yearbook 1967*, Statistical Office of the UN, 1968, pages 732 and 735.
*Canada Year Book 1970–71*, Statistics Canada, Ottawa, 1971, page 323.
Verbal communication from the Embassies of the Netherlands and of Sweden.
Verbal communication from Statistics Canada, Health and Welfare Statistics Division.

## Causes of Death

Something can be learned about the factors that comprise the health of a nation by studying the mortality figures in certain specific diseases and groups of people.

Although the causes of death are faithfully recorded[4] and their gradual swings (for example, the drop in tuberculosis and poliomyelitis and the rise in accidents) are noted with interest, they are not very informative as indicators of health. Since a death rate can change either because the frequency of a disease or its treatment has changed, it is not a precise indicator of specific problems and accomplishments. Nor does it reflect disabling impairments of health which do not result in death or which do so only after a protracted period of disability.

**Maternal and Infant Mortality**

The frequency of maternal and infant deaths probably varies directly with the fluctuations in the general level of health, living conditions and the standard of health care, and it is believed to be a fairly sensitive indicator of them. If so, Canada can be concerned all the more about its international showing. (See Figures 2 and 3 which reveal the statistics of the deaths of mothers and infants.) Again one notes a steady improvement with a slowing rate in recent years and again Canada is behind the leaders. In the case of maternal mortality the gap is narrower: a point that can be illustrated by noting that in 1967 Canada would have tied for first place if there had been three fewer maternal deaths during that year in each Province and Territory. It falls much farther behind with respect to infant deaths. In order to reach the level achieved by Sweden in 1967, Canada would have had to have saved an additional 300 infants per Province and Territory.

Much is made, in discussions, of international standing. It is important in many respects, but mainly as a goad to increased activity on the part of everyone, particularly those down in the list. Canada has no grounds at all for being pleased with its performance. At the same time some cheer comes from a calculation reported by the British Ministry of Health[5] which appears as follows:

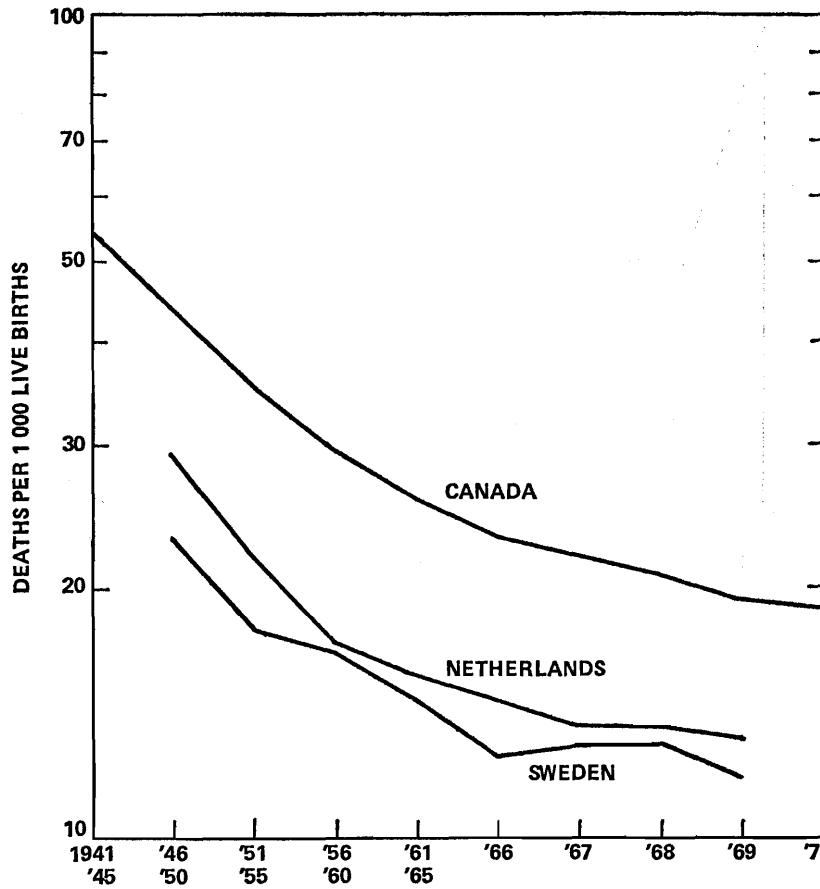
"If the rankings on standardized death rate, late foetal death rate, infant mortality rate and maternal mortality rate are *combined*, the following ranking emerges (for the period 1961–63):"

1. Sweden (with the best record)
2. Switzerland
3. Australia
4. The Netherlands
5. Canada
6. Czechoslovakia
7. Belgium
8. United Kingdom and United States of America
9. France
10. West Germany
11. Austria
12. Hungary
13. Japan
14. Italy
15. Portugal

**Prevalence, Causes and Severity of Disease and Disability**

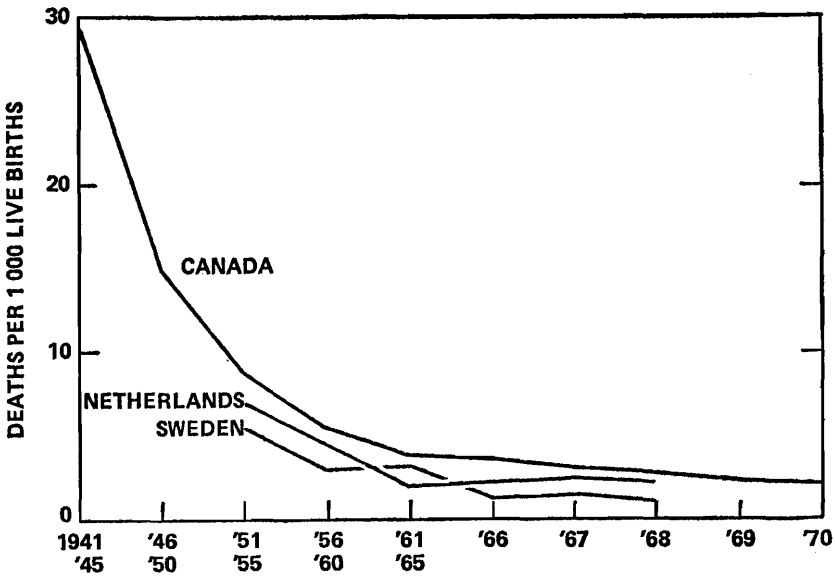
Here Canadian information is very limited both in scope and usefulness. Careful track is kept of certain reportable (mainly communicable) diseases and the number of traffic accidents. There is also scattered information about the prevalence of certain specific diseases of which special studies have been made. But in general, it cannot be said that there is any real statistical concept of the position. This is a serious lack which could and should be remedied.

Figure 2–Infant Mortality Rate in Canada and Two Leading Nations




*Sources: Canada Yearbook, 1970-71*, Statistics Canada, Ottawa, 1971, page 327.
*United Nations Statistical Yearbook*, 1962, 1967, 1969, 1970, Infant Mortality Rates, Statistical Office of the UN, Department of Economic and Social Affairs, New York.
Verbal communication from Statistics Canada, Health and Welfare Statistics Division.
Verbal communication from the Embassies of the Netherlands and of Sweden.

**Figure 3–Maternal Mortality Rate in Canada and Two Leading Nations**




*Sources: Canada Yearbook 1951-1971*, Principal Vital Statistics Rates of Selected Countries, Statistics Canada, Ottawa.
Verbal communication from Statistics Canada, Health and Welfare Statistics Division.
Verbal communication from the Embassies of the Netherlands and of Sweden.

## What More Might be Done?

### Hospital and Medicare Records

There is now a wealth of information potentially available in the data collected by hospital and medical care insurance schemes across the country. If this were organized in a more meaningful and accessible form than it is at present[6], the prevalence and causes of the conditions that bring people to the doctor's office or the hospital would be much better understood. **An urgent need is to assemble the information on prevalence of disease, etc., that is now in hospital and medicare records so that it may serve as one of the indices of health.**

### Health Survey

Valuable as it would be, the information derived from hospitals and doctor's offices is still insufficient. There remains a very large number of people with physical and mental disabilities who, for one reason or another, do not see a doctor or enter a hospital, and whose illnesses are, therefore, never recorded. From time to time health surveys of a population[7] have been carried out and there is a momentary glimpse of a local situation; but for the most part no one knows what is happening. Nor is it easy to find out – to do so would involve obtaining the necessary information from adequate samples of people across the country at regular intervals. In another field, the Labour Force Survey which has operated for many years has proved to be a useful method.

The difficulty lies not so much in organizing the surveys, but in knowing how to elicit, by questionnaire, reliable data on the perceived health status of individuals. The problem is one of accuracy, and the search (in the one relevant project in Canada that we have encountered[8]) is for the questions that should be asked and the way and to whom they should be put, in order to bring out the information that will permit a judgment on the physical and emotional well being and social adjustment of each individual included in the survey. Further research in this area is urgently required.

Granting the inaccuracies of the current methods, we feel that much valuable information can be gained by a systematic series of surveys designed to provide information on the state of health of the general population: thus, we recommend that a **Canadian Health Survey**[9] (a modified Canadian Sickness Survey – see page 42) be instituted. The initiative for this naturally rests with the Department of National Health and Welfare.

## Conclusion

We conclude that the information at present available, though insufficient to judge the state of health of the people, would be greatly increased if the following sources were brought together:

1. Vital statistics
2. Hospital Insurance and Medical Insurance records (on prevalence of disease)
3. Health Surveys.

# II. The Quality of Health Care

"The other day an experienced physician was asked what criteria he would apply in judging the efficiency of a hospital; what relative importance he would attach to the qualifications of the staff, the ratio of beds to nurses, the adequacy of special departments, the catering, the facilities for reablement, and the various other items on which inspecting authorities commonly make notes? He replied: 'I should not enquire into any of these things. I should simply go into the wards, select six patients, and find out precisely what had been done for them, and the care they had received, since the day of their admission.' This wise answer has implications beyond even the hospital services, for it embodies the truth that any kind of machinery, however ingenious, is but a means to an end."[1]

## The Question of Standards

Plaguing anyone who sets out to measure quality is the question of standards. It is painfully evident that these are sparse and, for the most part, imprecise – especially in the areas where it is most important to know about quality. Against what standard can one measure the quality of a doctor's practice, of his or her ability to diagnose, to treat or to handle patients? What standards should govern the utilization of laboratory tests, or hospital beds or therapeutic drugs? How easy should access to care be? What results should be obtained in this or that situation? To these and many more such questions, there are simply no satisfactory answers. But this regrettable, though not surprising, fact must not be allowed to dampen the ardour or stand in the way of those who are intent on measuring, or at least checking on, the quality of service. Even if the lack of sophistication forces the use of crude methods, there can still be progress and as time goes on, refinements will undoubtedly appear. **What is important is that a concerted effort be made to check on or measure, where this is possible, the quality of work that is done in the health field while the search for better methods is going on.**

## Why Measure the Quality of Health Care?

The question might be asked as to why this great concern over quality measurement? Is it because the standard of care is so low? Is it Bureaucracy having its fling? Is it because of cost? Or is there some other reason? The reason could hardly be that standards are low: they may be, but this is not known. Many people suspect that they are high, but they have no better reasons for their suspicions than the skeptics. Bureaucracy is certainly having its fling in health affairs, but the demand for quality control can hardly be attributed to this. Long before governments became deeply involved in health care delivery, quality control measures were being introduced in a wide variety of forms[2] – slowly, to be sure, but definitely the movement had started. Concern about cost is most certainly a factor: indeed, it is the spectre of continuing escalation of cost that has precipitated the current abounding interest in quality. And well it might, for people want

to know whether or not they are getting their money's worth. The personal appeal and the simplicity of this concern introduce a risk that it will be over-indulged, a point that we take up later (Chapter VI).

If worry about cost is a potent factor in the promotion of ways of measuring quality, it is not by any means, the only important one. A compelling reason to measure quality is in order to improve it. The very fact that checks are being made is a stimulus to all who are likely to come under scrutiny. This in itself is sufficient reason, but the matter goes much further: for **the process of improvement, starting with the spotting of faults and leading to the planning to correct them, the setting of targets and the judgment as to whether or not they are being reached depends, ultimately, upon measurement.**

## How Can This Quality be Measured?

An opinion on the quality of care in a community or a country can be based upon evidence gained by direct or indirect means.

### *The Direct Method*

The direct method, except under special circumstances and in a localized area, is hardly feasible at present. It would involve a thorough study of a large number of people with a variety of complaints, dealt with by a representative sample of doctors, under varying conditions. It would entail interviews with the patients, their doctors and others, follow up studies to assess results and a detailed study of the records, a much more involved procedure than that involved in the recommended Canada Health Survey. All this might be achieved in a special study, and, assuming that standards could be agreed upon, the findings would be of enormous interest; but it is unlikely that a routine survey of this type, repeated at regular intervals, could be sustained.

The direct method described in the quotation at the beginning of this chapter is very appealing. There is no doubt that an experienced clinician can size up, extremely accurately, the work on a hospital ward or in a doctor's office simply by looking at a few patients. Why, then, shouldn't the practice of bringing in "External Examiners" be adopted as routine? Possibly it would work; but only if the examiners' opinions were so highly respected that they would be accepted even when they were severely critical. It is almost too much to expect that a single judge's opinion would stand for long if it were adverse. Complaints would be raised, a committee would be demanded, objective standards would be sought and eventually "ingenious machinery" would be brought in to do the job. Nevertheless, there is still a place for this approach. It can work well, particularly in rural areas, as has been demonstrated in various parts of Saskatchewan and Nova Scotia. Furthermore, it should be recalled that it is the examination of patients to "find out precisely what had been done for them...", **the direct method, that should be employed regularly by every chief of service in every hospital, and as the ultimate form of examination where the competence of an individual or an institution is being questioned.**[3]

## *The Indirect Method*

By the indirect method we mean the assessment of the quality of care by examination of the records or by direct examination of small unrepresentative samples. There are many forms of records available that are not sufficient for our purposes but are well worth assembling for consideration.

### Vital Statistics

Vital statistics such as analyses of deaths from all causes and deaths from specific causes in particular age groups, are of limited value in the present connection because, as observed earlier, personal health care is only one of the factors that influence longevity and it is not the most important except in the case of the mortality rates of mothers and infants.

Measurements of frequency of disease and disability are likewise of limited value here. Unless used and interpreted appropriately they can even give misleading testimony on the question of the adequacy of care. If, for instance, the management of diabetes or hypertension were to improve markedly without any change in incidence, the prevalence of these diseases in the population would increase. Further, any improvement in the recording of the occurrence of these diseases could lead to an apparent increase in their incidence.[4]

### Spot Examinations

*In Hospital*

Ideally a hospital will organize its medical staff to form medical audit, tissue, utilization, and infection committees; each ward service will keep an account of the deaths and complications that occur in it and will critically review the results regularly. This is not universal practice at the present time.

All accredited hospitals[5] have the appropriate committee structure, but it is not known how conscientiously or effectively the committees perform. Nor is it known what proportion of non-accredited hospitals have any effective system of quality control. It is probably low.

The information that those various activities can yield is of vital importance to the authorities responsible for the quality of work in the institution but, with the exception of the medical audit,[6] it is strictly spot-check information and, except in extraordinary circumstances (good or bad), it has little comparative value. (That is, the findings of committees at one time cannot profitably be compared with previous findings or with those of another institution.) It should be possible to develop an "audit" of work in a hospital[7] in a way that could be repeated at regular intervals and that could indicate progress – or lack of it – and be a basis for comparison with others. It is not easy to find many quantifiable criteria of good care on the Medical (as distinct from Surgical) services of a hospital, but there are enough crucial items in the hospital as a whole[8] that brought together would give a useful estimate of the standard of work.

*Case Studies*

An important means by which the quality of health care is measured is the

study of specific groups of people (for example, neonates) or people with specific injuries or disease. It is standard practice in well-organized services to maintain a continuing review of the results achieved by various regimens of treatment or management. Outstanding examples of the use of case studies for the purposes of quality control are to be found in the practice of some of the Workmen's Compensation Boards who keep close track of the care taken of their charges, recording and reviewing the results of treatment of the various injuries and illnesses and taking appropriate action to correct faults as they appear. In many clinical services in hospital, a running account, in certain conditions, is kept of the results. Many hospitals run "follow up clinics" of various sorts. Could it be known, the volume of work done in checking quality in these ways, and, incidentally, controlling it, would undoubtedly be found to be great.

**Surveys**

Much can be learned by surveying specific groups with reference to the quality of the health care they are receiving or giving. Examples of the types of surveys that have been carried out in Canada are as follows:

*Of Doctors*

The classic Canadian survey of doctors was carried out by Dr. Kenneth F. Clute some years ago.[9] In this study the work of each of some 86 general practitioners in Ontario and Nova Scotia was followed closely over a three day period by an experienced observer. In questions of doubt, the doctor was given the benefit on each occasion, but even so, the judgment was that approximately 40 per cent of the doctors in Ontario and Nova Scotia were practising poor medicine; for 20 per cent it was not possible to decide if the standard was good or bad; and in the case of 40 per cent the standard of practice was judged to be good. The importance of these findings is unquestioned. In fairness it should be pointed out that this survey was carried out some time ago (1956–60) and that it included only general practitioners working for the most part alone and often in isolation. It, of course, provides no information about the standards of work of specialists in the area nor of practitioners working in a group.

One wonders what a similar survey done today would show. There have been changes since the survey was done – undergraduate, postgraduate, and continuing education have been transformed; more doctors are working in groups; communications are better. Probably, the standard has risen; lacking evidence we cannot say so. But whatever current importance one attaches to the actual findings, in so far as the quality of care is concerned (and it cannot be ignored) there were a number of highly significant points brought out by the survey. The following are of particular interest here:

1) There was found to be a distinct relationship between age and standard of practice, with a definite falling off of the latter with increasing age.

2) Isolation (from other doctors who would teach, stimulate, criticize and compete) played a role in bringing about deterioration in a doctor's ability to practice good medicine.

3) The faults that were found with a doctor's practice had in nearly every instance to do with failure to carry out the fundamental procedures such as the taking of a proper history or the conduct of a proper physical examination, or to carry out some simple procedure such as the sterilization of an instrument. Few faults had to do with the lack of knowledge of recent advances.

4) The last concerns the difficulty involved in assessing a doctor's capabilities. It might be that with experience the necessary points could be covered in a shorter time than was taken in this study; but it seemed to be well established that a sound opinion on a doctor's ability to practice could not be reached without painstaking examination of the doctor at work. We shall return to these points in later parts of the discussion.

*Of Nurses*

Under the auspices of the Canadian Nurses Association, a major study was undertaken in 1963 and reported in 1966.[10] Twelve hospitals (one in each province and two in Ontario and Quebec) were visited for a 2½ week period each by a team which conducted an exhaustive survey involving direct observation on the wards, the questioning of supervisors, nurses, patients and others, and examinations of the administrative arrangements and the facilities.

As stated in the preface to the report, the nature of the project made it difficult to reach firm conclusions in some areas but it was valuable in establishing criteria of quality for nursing service and nursing care and identifying broad areas requiring study and improvement. It is of interest to note that 73 per cent (of 136) patients questioned spoke highly of the quality of nursing care that they had received. This report has given rise to a substantial interest, on the part of the nursing services of many hospitals, in the question of quality of evaluation.

A committee of the Canadian Nurses Association is at present grappling with the problem of finding some means of measuring the quality of nurses, that is, the quality of the care given by the individual nurse to his or her patients (as distinct from the quality of nursing service taken as a whole).

*Of Consumers*

Until relatively recently the opinion of, and the information that could be given by, the "consumer" was seldom sought. The Canadian Sickness Survey[11] in 1950–51 was a major effort to compile his or her opinion, but from then until about five years ago "market surveys" were few in number, limited in scope and localized. In recent years a number of major surveys have been undertaken. The information to be derived from these covers a wide range of subjects, many of them related to the quality of care. Surprisingly (to many) the responses by the people to the questions about the care that they had received were, for the most part, favourable, in urban and rural, prosperous and less prosperous districts. Few truly poor districts were included.[12]

These findings are not confined to Canada.[13] There are similar results in all the other areas collaborating in the World Health Organization[14] and in Australia[15].

Could they be true? Is the medical care in all these places (including our own) so good as to properly satisfy people? Or is there something wrong with the method of investigation? "Perhaps", says Greenhill, "wrong questions are being asked, or the right questions asked the wrong way". This may be. In these particular surveys there can be no doubt about the skill, experience and conscientiousness of the people involved. However research by questionnaire has not yet reached a high level in precision, particularly when it is opinion rather than fact that is being sought. One need not be greatly concerned with deciding upon the extent to which these figures are to be believed. They cannot be used to support an argument that all is well in matters of health care and that nothing need be done. At the same time, they can justifiably be shown to anyone who suggests that the system is rotten to the core and must be revolutionized. Between these two extremes lies a no-man's land of fruitless argument and a fertile field for research.

One cannot help reflecting how unusual it is in these days, when crying havoc is so much in vogue, to be dealing with a situation which is apparently too good to be true!

*Survey of "Consumers" concerning Dental Care*

In 1963 a survey of dental practice carried out by the Canadian Dental Association revealed that 43 per cent of all Canadians over two years of age had visited a dentist in that year.[16] This does not mean, of course, that they received complete care.

A second survey carried out for the Department of National Health and Welfare by the Dominion Bureau of Statistics confirmed the above finding by indicating that 41.8 per cent of the total sample had visited a dentist at least once during 1967.[17] So far as we have determined there is no substantial evidence bearing on the quality (as distinct from quantity) of dental practice in Canada.

**Profiles**

*Of Doctors*

From the information supplied by the doctors on the forms that they fill out for billing Medicare, a profile can be established for each doctor. At present, the data[18] to be obtained from this source are decidedly limited, but even without expansion, much can be deduced from them. In most provinces crude "norms" (so far only in terms of volume of service) have been established for each type of practice. The cases of doctors whose performance carries them widely outside these norms are reviewed by committees, the composition of which varies from province to province, but in general consists of a mixture of doctors and government respresentatives, or doctors appointed by the government on the recommendation of the appropriate College of Physicians and Surgeons.

The variation in the composition of these committees and the difficulty that has sometimes been met in finding an acceptable formula attest to the delicacy of the situation. Centralized information about the individual is to most citizens a frightening prospect and rightly so. The doctors have not only their personal interests to guard but also those of their patients; and their resistance or reluctance to have the details of their

practices "taped" by the government is the greater for that. This, balanced against the genuine need recognized by virtually everyone, to have enough information to permit judgments on quality, constitutes a major problem that is slowly being worked out. Where doctors' "profiles" have been operating for several years, it appears that many of the earlier suspicions have been allayed.

*Medical Audit*

There are two main types of audit:

1) Record Review System: Files are drawn at random and examined in a variety of ways in different systems, all designed to determine the quality of care received by the particular patient. The process is laborious, if very revealing, and is difficult to sustain in large volume at a high level. It is extremely valuable as a spot check (as used in accreditation inspections).

2) The Discharge Abstract System: Here, the hospital Record Department, taking information from the file of each patient, fills in a form which is used to produce computer-printed tables displaying this information in whatever combinations are wanted. This process, too, is laborious, but it has already proved valuable and its potential is great. As Last put it:

"The *purposes* of the audit are primarily administrative, although there are secondary educational benefits and commonly many benefits to patients. The administrator can evaluate the efficiency (but not necessarily the effectiveness) of each component of the service whose activities are audited in relation to case-load, case-mix and so forth. Educational benefits follow from the critical self-appraisal by participant physicians; obvious benefits to patients follow from this. The process of peer review may be obtrusive or unobtrusive, but no alert and conscientious physician can ignore the lessons to be learnt by retrospective review of his own performance, regardless of whether he concerns himself also with the performance of his colleagues. Furthermore, the audit procedure exposes physicians to sometimes unfamiliar aspects of numerical analysis and so enlarges their intellectual horizons in a new direction. Benefits to the community can also follow. If the medical audit reveals an unusually high rate of normal organ removal (e.g., high proportion of hysterectomies where the pathologist reports a normal uterus) the responsible physicians may acquire a stronger super-ego, and subsequently the women of that community more often may be permitted to retain these organs intact, except when preoperatively diagnosed disease indicates the desirability of their removal."[19]

Many of our hospitals in Canada have adopted the discharge abstract system of medical audit. Occasionally the audit is carried out independently by the hospital; much more commonly, hospitals contribute to an organized system. Of these, two are used by a large number of Canadian hospitals:

a) The Hospital Medical Record Institute in Ontario[20] which now serves approximately one hundred hospitals in Ontario and a scattering in B.C., Nova Scotia, and Newfoundland (handling in all 57 000 departures per month in 107 hospitals).[21 22]

b) Medical Audit Programme–Professional Activity Study (MAP-PAS)

of Ann Arbor, Michigan, servicing some 200 hospitals in Canada housing nearly 40 000 beds (out of a total of 1 423 hospitals and 210 600 beds in 1970). Of these 124 are accredited and 37 have an affiliation with a Medical School. Each province and territory has at least one hospital involved, but otherwise the distribution is very uneven, for Alberta hospitals constitute more than half of the some 200 subscribers. Most of the hospitals involved take only the PAS service. Approximately 25 subscribe to the Medical Audit Programme.

It can be seen from the above that already a large number of our hospitals are using the Medical Audit. It cannot be said, at the present, how much value they are getting out of it. For most, it is a relatively new experience. It is clear, however, that the technique is manageable and flexible. With experience it should be possible to refine the process to a point where, for the purposes of quality assessment it will be of unquestioned value.

## Bringing It All Together

We have touched briefly upon the many ways by which the quality of some aspects of health care can be judged. Few of the individual items are precise *but brought together they could provide highly useful information.* Furthermore the very bringing together of all this material would, itself, point to the further information or ways of handling it that are required.

## Quality Assessment – Whose Responsibility?

It should be observed at once that, so far as we can determine, in no region of the country is there any organized system of quality assessment in which the results from the various sources are assembled and studied, and plans developed for improving quality. Until very recently, quality control was a matter of private enterprise or conscience. That it should become a matter of public interest can only speed the progress which has been delayed for a number of reasons.[23] Not the least of these reasons is the fact that up to now, and still, nobody is clearly responsible for the quality of care across the board. And in some provinces, nobody has the legal right to take some of the actions that might have to be taken in certain cases to determine whether or not things are being done properly. It is important that the questions of the responsibility and the authority for bringing together the people and the facts be settled; for until it is, the confusion in some instances and the lack of communication in others will persist and relatively little progress will be made.

The Colleges of Physicians and Surgeons have, in the different provinces, various mandates. These, in every case, involve the licensing of physicians and all that goes with that procedure; but the duty (and the power) to maintain surveillance over the quality of the work of licensed physicians (except in cases where complaints are lodged) is seldom clearly spelled out, although in most provinces the statutes appear to show an intention on the part of the legislatures to invest the Colleges with a responsibility for ensuring competence.

The by-laws of most hospitals place the responsibility for maintaining the standard of the work in the hospital on the Board of Management

(Governors, Trustees). But they are not clear as to who should see that this function is discharged, except to a limited degree in those hospitals that are accredited.

If, as we firmly believe, **assessment of the quality of work across the board is essential to the proper functioning of the system, the responsibility for it should be clearly defined.**

There are many considerations. For instance, there are, in the system, several institutions involved (the Governments, the Health Facilities – hospitals, laboratories, etc.), and many professions and trades (Medicine, Dentistry, Nursing, Technicians, etc.). Hence the question is naturally raised as to whether there should not be some overall body whose duty it would be to ensure that assessment of the work in each aspect of the system was being properly carried out. This might be feasible, but it would be difficult to arrange, and, whatever form such a body might take, account would have to be taken of the fact that in each profession the quality of work performed by its members can only be properly judged by those who are thoroughly familiar with the work itself – the peers. While the question of overall assessment is being considered there is much that can be done, particularly with respect to the work of doctors, by way of promoting the assessment procedures that are already fairly advanced in many hospitals and have begun in practice outside, and thus to formalize what in many places is current practice.

We believe that **the Colleges of Physicians and Surgeons should be clearly charged with the responsibility of assessing and enhancing the quality of work of doctors, whether that work be in or out of hospital.** This does not mean that nobody else should be involved in ensuring that this responsibility is properly discharged. – (see page 68). In the case of hospital work, an understanding would have to be reached with the Hospital Association, with each hospital, and with the Canadian Council of Accreditation which latter, we urge, should serve all hospitals and should include amongst its criteria of accreditation machinery for quality assessment. In the case of work outside hospital, the Colleges would have to cooperate with the Government services involved in the collection of data for the purposes of Medicare.[24]

## Research Into the Quality of Health Care

Our search for research projects (see Appendix 5) would be unlikely to discover numerous and significant pieces of work related to the quality of health care that are probably in progress. We refer to the summaries of the work of Medical Audits, Tissue Committees, etc.; to the reports that are prepared as a matter of routine in many hospitals on complications and deaths; and to the studies of the results obtained in special groups of cases which are part of the job of any well-run service.

The list (see Research List Nos. 1–45 in Appendix 2 of the Supplementary Papers) is thus very incomplete, but the fact that so little has turned up in the way of research into better methods of assessing health care during the course of our survey suggests that there is an unfulfilled need for activity in this area.

# III. The Quality of the System

"Bricks are important, but a pile of bricks is not a house."[1]

## The Indescribable Anatomy of the System

Reaching as it does into practically every corner of society, the Health Care System is diffuse and complicated. It involves governments at all levels, universities and colleges, health professions of many different types, administrators, volunteers, community workers: people in practically all walks of life. It is concerned with education, research, and a host of skills. It is beset with problems of organization and management. It forms part of the fields of sociologists, social workers, pyschologists and environmentalists. Indeed so numerous and intricate are its parts and the relationships between them that the system is virtually impossible to describe!

## The Describable Goal

If description is difficult, it is, perhaps, simpler to outline the *purpose* of the system: the efficient provision of comprehensive, co-ordinated and competent care. In simpler terms this is usually taken to mean the provision of full care for all illnesses to which man may fall heir, and the application of preventive measures. It implies close liaison between the preventive and the treatment services and between the various elements of each of these, in such a way that there be neither overlap nor gap; and that, for the individual, there should be easy access to and passage through the Health Care System.

To set as a goal the provision of care as thus defined is, in the light of present circumstances, to assume a substantial task; for if there are at the moment all the facilities and nearly all the people required to do the job, the adjustments and realignments that are necessary to forge the links are formidable and will take time to achieve.

But this is not enough, as has been so frequently pointed out: one must think far beyond that which presently comes within the scope of medicine itself. It is essential to examine the way that people live, the things they eat, the air they breathe, the habits that they develop – indeed the host of factors that impinge upon a person's well being or health – for herein lie some of our greatest weaknesses whose correction will raise the level of health, particularly mental health, more than any advance in medicine itself.

No one would be likely to argue against such a proposal, yet for the purposes of this study there obviously have to be lines drawn. Thus, while we have attempted to find out what research is currently (1970-71) being carried out in the health-related social fields in order to form an opinion as to the volume of effort being expended there, we have largely restricted ourselves to those aspects of the system which seem to us to be directly pertinent to the delivery of care to the individual. Notwithstanding, we acknowledge the immense, indeed the overriding importance to health of the social and environmental factors. We urge the necessity for all those engaged in the health field to provide both impetus and information to those more immediately involved in working toward the improvement of social conditions.

## The Measurement of the Quality of the System

The indices of health discussed in the first chapter tell a good deal – but not all, by any means – about the quality of the system itself. Without something of a "system" it would be unlikely that a country's record in, for instance, life expectancy, maternal mortality and infant mortality would be good; but it would be possible to have a fair record in these and yet have a system that was wasteful and inefficient and, from the individual's point of view, poorly run, inconvenient and exasperating.

### The Importance of Local Opinion

How can some measurement of these important aspects be made? There are no indices, no "inconvenience factors" or "units of exasperation", and yet there must be found some way of determining how well the system is functioning in all its aspects. Undoubtedly, as time goes on, there will be recognized certain key factors whose measurements will show how well the system is performing; but until this is achieved, judgment will be largely by impression – and it will be necessary to rely almost entirely on local experience and opinion.

And it is important that the experience and opinion be local for so great are the variations in geography, climate, economy, social conditions and legislation in the different areas, and so complicated and varied are the organizations and facilities for health care delivery, and so important, even, are the local habits, that an intelligent and productive survey of an area can only really be made if the people of the area itself are intimately involved.

A further reason for urging that self studies of areas be made is that people are only likely to change their ways if they fully understand the reasons for the change: people are only likely to submerge their interests if they can be satisfied that to do so is to subscribe to the common good and they are only likely to regard an action as being for the common good if they have played some part in defining both the action and the common good.

By area, as the term is used above, one means any region large enough to contain most of the elements of a health services system and yet small enough and sufficiently coherent socially to be a manageable unit from the point of view of organization and function. It would seem that areas might vary markedly in size, both geographically and in population. In some instances a city or part of a city might be an area for the purposes of health services organization. In others (for example, Sherbrooke) the area might be considerably larger involving a sizeable fraction of the people, the area and the facilities in a large province; in still other instances, an area might involve the entire province if general conditions so dictated.

Regionalization, a vital subject, will be discussed in greater detail later,[2] for the present it is sufficient to say than in order to make a proper estimate of the extent and the nature of the problems in health care, to arrive at sensible solutions and to effect these solutions, it is necessary to divide the country up into functional units.

There are a number of approaches that a region can take (as it tries to

determine how it is faring and what it should do) and every region will undoubtedly have to take several, but the simplest, for a start, is to see how closely the expectations of the people (the consumers and the purveyors of health care) are to being realized.

## Reasonable Expectations in Matters of Health Care

The system in any given community can be examined from three points of view: that of the person who needs care, that of the professionals, and that of the governments. Each has certain objectives which, far from being mutually exclusive, are closely interrelated. Precedence here is given to the first of these for the obvious reason that the ultimate test of any system is the standard of its product – in this case, the care of the individual.

### The Consumer

The *first question* is then, what can a person reasonably expect in the way of health care?

It will soon be apparent that this question is far from simple, for it exposes a whole range of a person's wants and worries about his well being. The answers, seemingly simple, are deceptively so when expressed in straightforward and sweeping terms as follows:

**A person should have access, without barriers of any sort, to a co-ordinated system of health care which embraces the full range of facilities of high quality, operated considerately and efficiently. There should be, within this system, continuity of care and as much freedom of choice (of doctor, dentist, service or institution) as is compatible with the smooth operation of the service.**

The elements of these expectations are considered in more detail as follows:

*Easy and Immediate Access to the System*

In the first place, *everyone should be able easily to find out what he should do or where he should go when he feels that he needs advice about his health.* He should be able to make contact at any hour, by telephone or directly, with a competent person who knows the available facilities, who can make a judgment of the needs, and can direct, or make arrangements for him to go to a specific physician, dentist, clinic or other facility. This person should be able to arrange for transportation when required in urgent situations or for a visit to the home by someone competent to deal with the situation.

This implies some easily available person who "knows the ropes" and can either start the patient on his way or direct him to someone who will. It is evident that in many parts of the country this service is now generally available to all those who can reach a doctor or dentist. That it is not universally available is equally evident in many ways, the most readily demonstrable of which being the large and increasing numbers of people across the country who, though not urgently ill, seek advice in the first instance at the emergency departments of hospitals.

The importance of this first contact adviser lies not only in the satisfaction of the peoples' sense of security, but in improved efficiency: for

much of the patients' and of the attendants' time is now wasted if the patient enters the system at the wrong point.

If there are enough doctors, and dentists, if they make themselves available, and if the patient knows how to reach them, there is no problem. If there are not enough to meet the demand one of two solutions must be found: more must be trained or brought into the country or some other persons must be trained to do the job. In a later section of the study (page 75) we suggest that Nurse Practitioners be trained for this purpose.

*Ready Access to Co-ordinated Facilities for Prevention, Diagnosis, Treatment and Rehabilitation*

This involves access to attention immediately in urgent situations and as rapidly as required in less urgent cases, but attention never so delayed as to seriously inconvenience the patient or, in effect, deprive him of care.

There must, for the well, be ready access to preventive services (for example, immunization, health education, counselling, prenatal and well baby care, family planning, and mental hygiene services), and for those who are ill or who believe themselves ill, there must be a co-ordinated, consecutive process starting with a comprehensive and efficient assessment of the social and medical needs and continuing, where indicated, through a course of diagnostic, treatment and rehabilitation procedures.

*A Guide Through the System*

Once in a system, a person should have someone to whom he can appeal for guidance and assistance. Typically, this function is performed by the family or first-contact physician who follows the patient through the process of investigation, treatment, rehabilitation and continuing care. In situations where there is a shortage of physicians, it will have to be carried out by someone else trained for the purpose. *But the patient must have someone who knows or can readily find out about his case to look to for help.* To the extent that the facilities in the system are co-ordinated in such a way that the patient can be dealt with efficiently and considerately, the task of the "guide" will be reduced.

*No Financial Barrier*

This does not necessarily mean that there should be no direct charge. It may be that with time there will be no such charges made, and with the introduction in Canada of Hospital Insurance and, more recently, Medicare the trend is in that direction. But the issue as to whether or not all services, facilities and treatments should be prepaid is by no means settled and, indeed, cannot be settled until the costs of whatever system emerges in the various parts of the country are known. However, the principle applying to all health care – that no individual should be refused help because he cannot pay for it – should be upheld in all circumstances.

*Freedom of Choice*

There should be as much freedom of choice of doctor or service or institution as is compatible with the smooth operation of the system. Under the conditions that now obtain in private practice in Canada, the patient has a

considerable degree of freedom to choose his own doctor and dentist. In group or private clinic practice, the choice may be restricted to some extent for administrative reasons, while in hospital outpatient work it is sharply restricted if it exists at all. In any "system" that might be developed the question of the patient's choice should always be considered and it should be honoured whenever possible within the system.

**The Health Professional**

The *second question* concerns the health professionals – the doctors, dentists, nurses and health workers of all types – who operate the system and upon whose enthusiasm, skill and devotion to duty the success of the system depends. This question may be phrased as follows: What basic conditions must be met in order that a high level of professional care may be achieved? The answers lie in the incentives: there must be incentives for the individual to enter the profession and, once in it, incentives to excel.

*Pre-entry Incentives*

The pre-entry incentives are mainly inspirational: the knowledge that this is a good, rewarding and exciting profession in which a person can serve, be respected, etc. There might be, in certain sectors of the health profession, need to provide a financial incentive (for example, bursaries, training grants) in order to fill gaps that otherwise would not be filled.

*Post-entry Incentives*

Once a person is a health professional, progression in seniority, responsibility and financial reward related to the value of his or her contribution to the service are important.

1) There must be freedom for the individual doctor or dentist to exercise clinical judgment within the limits of sound practice as determined by peers.

2) There must be good facilities and conditions of work.

3) There must be intellectual stimulation. This applies to all members of the health team, no matter how it is organized. To maintain interest – and this is vital to success – the individual must be constantly challenged intellectually through contact, if not cooperation, with those involved in research, with the trial and application of new methods and in the critical review of the results of the work of the individual and his or her colleagues.

4) There must be freedom of action, in so far as possible, for the health professional to choose the form of practice that he or she is to pursue.

**Government Responsibility**

The *third question* involves the Governments that have in large measure assumed the responsibility for seeing that care is provided – "What is this responsibility?" It is, in brief, to ensure that there is available to every person in the country care of the highest possible quality.

## A Glance at the Faults of the System

Many of the listed aims are now being met: others are not. Considering some of the aims individually and expressing our impressions, for lacking firm data they can be no more than that, we have these suggestions concerning the faults of the system.

### Access

With respect to overcoming the barriers to access, we are fairly well off. Financial impediments to medical care, but not to dental care have largely been removed by the institution of Health and Hospital Insurance. As to other impediments, unquestionably there are many areas in the country, both in isolated parts and in cities, where for one reason or another the facilities and personnel are inadequate; but generally the score in this category is moderately good. Physicians, dentists, nurses, hospitals, and other facilities and people are distributed in a way to provide the vast majority with reasonable access. This does not improve the lot of those who cannot get help; nor does it lessen the necessity to find service for the needy areas wherever they may be. We shall be touching on this aspect later – at the moment we are describing our impression of the overall picture.

### Ease of Access

We do not know of any well-planned studies that relate to ease of access other than those previously mentioned (page 42 and Appendix 11 of the Supplementary Papers) and these suggest that access to a doctor is easy. This may be the case, but it most certainly does not correspond to the general impression, so frequently voiced, which states that doctors and dentists are often difficult to find, that appointments frequently are long deferred, and that it is, for some, hard to find out what to do and where to go. The general impression seems, further, to hold that once in real trouble a patient gets immediate and competent attention – in a hospital – but short of that the care is erratic.

### Co-ordination

The system has developed as a series of individual enterprises and, speaking generally, these have not fused. Hospitals were started by groups of individuals, religious orders or municipalities as independent institutions and they have maintained, to a large extent, their very natural and, in most respects, admirable pride in themselves and their work. So far the tendency to submerge their identity and join in co-operative efforts with others has not been great.

Doctors and dentists have developed their practices as independent initiatives, alone or in groups, in places where the opportunity seemed best. There has been, to all intents and purposes, no co-ordinated distribution, no other guide to their location.

The attention that patients receive in a doctor's office is often not fully co-ordinated with that in hospital; nor is the diagnostic work. There is usually little interrelationship between hospitals, nursing and convalescent

homes, home care programs, voluntary and public health nursing services, rehabilitation centres, or public health and welfare services: thus the possibility of providing comprehensive care is limited. Nor in many cases are the facilities organized to meet the convenience of the people. For example, it is the rule for people to have to leave work in order to attend a clinic.

Finally, to end a long yet incomplete list, there is often a lack of co-ordination between units of government Departments of Health, and practically no co-ordination, in this sphere, between different departments. Between the federal and provincial Departments of Health the co-ordination is, to put it safely, imperfect. It is clear that the elements of the system are not well co-ordinated. Lack of co-ordination, indeed, is the basic fault of the system as it now exists.

**Continuity of Care**

Dependent as care is upon a series of co-ordinated facilities, it is unlikely that continuity of care should be a conspicuous feature of our system: in fact it is not. At the very least it is not an automatic feature, for it requires the active and intelligent efforts of the doctor to steer a patient through the maze of office, diagnostic laboratory, consultant's office, hospital, convalescent home, in each of which a new and independent record is generated (and usually kept, unless specifically asked for), and the patient may lose his "guide".

The score on this point is low.

**Facilities**

Traditionally the central facilities in the health care system have been the hospitals, and of these there is a good supply – indeed, it is held, too good a supply – both absolutely and in relation to the other health care institutions. The quality of our hospitals is, in general, high. We cannot say the same for all institutions, for instance, nursing homes, some of which are reputed to be frankly poor. Nor can we say that there are enough facilities besides the hospitals to take care of those who cannot be tended at home and yet do not require the services that an acute care hospital is equipped to provide. This lack is reflected in the cost of health care: it also deprives many people (convalescents, those who need rehabilitation, and some "incurables") of a service that they might very reasonably expect.

**Efficiency**

As to the question of the efficiency with which the facilities are operated we cannot make any confident statement. There are, we know, serious efforts being made to improve efficiency in several parts of the system and we discuss these in connection with the cost of the service. One of the great problems is to know what level of efficiency is possible. For example, the efficiency of a hospital cannot be equated with that of a factory in which the articles being processed, always inanimate, are not capable of devising difficulties on their own as are hospital patients or relatives, in which the variety of problems is seldom as great, and in which a chain of command is much more clear cut. Obviously there are some gross inefficiencies; we

have no way to gauge their extent, but we feel bound to score ourselves low again.

**People**

Complaints about doctors (difficult to get, inattentive, careless), nurses (too much desk, too little nursing) and dentists (too hard to reach) are rife. But criticism of anything within reach of the voice or pen is rife, and it is hard to place a value on the complaints that one hears. There are centres of excellence associated with our medical schools that we believe to be definitely first rate. Outside of these the standards are difficult to judge even informally.

Probably, if the truth could be known, the quality of Canada's health professionals is as high as is to be found in any country. But this does not mean that the level is particularly high in relation to what it might be.

We feel confident in recording as a fault in our system the lack of incentive and stimulus for practitioners (doctors, dentists, nurses and others) to excel. This goes hand in hand with three other lacks:

- a requirement for professionals to maintain their standards,
- sufficient opportunity for continuing education, and
- teamwork

each of which can be a strong stimulus to improved performance.

**Cost**

There is little doubt that the system is, at present, too costly for what it yields and this has been a matter of public outcry. The actual amounts involved and the high proportion of our total expenditure that they represent are disturbing enough, though difficult to assess because it is not known how much should be spent; but extravagance and waste resulting from poor co-ordination and inefficient management is relatively easy to gauge. We have tried to discover the moves that are being made to correct these faults (page 112).

## The Search for Solutions

What chances are there of finding solutions and what progress is being made?

If the main faults mentioned above are numerous and cover a wide field, they are, in effect, closely related and the solutions to the problems they create lie in three general areas:

1) *The People* involved, health professionals, administrators, etc., and their attitudes and competence.

2) *The Organization* of these people, the system in which they work.

3) *The Management* of that system.

It is in these contexts that we have organized our examination of the progress that is being made toward finding solutions.

# IV. The People Involved in Health Care

## Attitudes to Change

If there are to be great changes in the form in which health care is delivered, the present attitude of the people to be involved in these changes is of importance in predicting the speed, the ease and the eventual effectiveness with which actions leading to change will be attended.

We have been interested in assessing the attitudes to change of the Governments who control the purse strings and who can open or close them to influence, if not dictate, what will happen; of the professions and the students entering them, upon whose skills and enthusiasm the strength of any system will depend; and of the institutions preparing the students and facilitating research.

If one were to judge attitude to change by the words that are spoken, one would say at once that it was strongly and uniformly favourable. Nor need one suspect that the words are necessarily idle, for strength has been added to them by the fact that in many instances they have been supported by action.

### Governments

Governments, both federal and provincial are virtually committed to change. With the successive advent of Hospital and Health Insurance, the Government Health Agencies have steadily enlarged and, in recent years, have taken on research and planning staffs. These are rapidly becoming functional. Governments have initiated major surveys[1] that have resulted in wide-ranging and forward-looking recommendations, many of which have already been implemented. The Federal Government, having led the way to universal Hospital and Health Insurance across Canada, is maintaining its active role by mobilizing experts from all parts of the country to discuss, report and recommend on matters of immediate interest,[2] and by supporting research in the field of health care by means of a fund established for the purpose.[3] The Provincial Governments are building up impressive staffs to administer various aspects of health care.

### Universities and Colleges

The universities are, in many instances, reorganizing themselves administratively to form new complexes, Health Science Divisions, comprised of most of the elements of a university that are related to health care. In this respect they are committing themselves to, or at least anticipating, change, for if the system is to be co-ordinated, the different fields within it will have to work together more closely than they have up to now. In all Faculties of Medicine there have been the most remarkable upheavals in curricula. It is safe to say that in none of the Medical Schools does the instruction today bear close resemblance to that of five years ago. Nor, it may be added, does the attitude of most of the students and the professors.

Traditions of long standing, dating from Flexner,[4] are being broken down. Rigidities are being fractured; the time devoted to basic sciences is being whittled away; hospital-based teachers no longer hold absolute sway over the students' last two years in Medical School; the students see patients much earlier in their medical career than they used to; they meet

early with family practitioners in both the doctors' offices and in teaching hospitals to the staffs of which, increasingly, the practitioners are being appointed.

A fair proportion of students gain experience in teamwork in the Family Practice Units that have been established in many centres.[5] Of considerable importance, as well, are the residencies in Family Practice that have been established in many hospitals.

Finally, in this connection, students are no longer bound to follow a fixed course. In the lengthy elective periods established in most schools, students can follow their own bent in choosing from a wide range of offerings. Somewhat similar, though less dramatic, changes are to be seen in the Schools of Dentistry.

All this is conducive to the modification of attitude and hence to change in a system in which for many years the cult of science has – or is reputed to have – held sway.[6]

Interestingly enough, as the current trend in the education of doctors is away from theory and toward the patients' side, the *nurses* are moving in the opposite direction – from a course in which training on the hospital wards was the predominant feature to one in which the bulk (in time) of the instruction takes place in the community colleges. This does not mean, however, that the nurses' attitude toward change in the system will be the opposite; indeed all the evidence points to strong support by nurses for what they conceive to be progressive change.

*The Community Colleges*, for the most part newly formed, can be regarded with respect to attitude to change as already part of the "new system", for they have taken on the training of people in many of the health fields and are in a position to bring about a degree of co-ordination unknown previously in this area and essential to future developments.

**Doctors and Dentists**

We see, up to this point, the governments, the universities and colleges, the nurses and health science students, all working toward a new order – still poorly defined – but different. What about the doctors and dentists who are reputed to have opposed major changes in any country and at any time? How are they responding here and now? The position is not easy to assess. One's opinion is bound to be influenced by rows that have taken place in recent years in connection with the introduction of Health Insurance in two of the provinces and quite unimpressed by its relatively smooth passage in the other eight. Also outstanding in anybody's thoughts when they consider the position of doctors, are the serious arguments between them and the government over the question of payments for service. Confrontations of this sort have brought out the worst on both sides and have served to do little more than cloud the whole issue of the possibility of fully cooperative action.

Obviously, the professions are suspicious of government control and will, in all likelihood, continue to be so – at least wherever the actual practice of medicine is touched upon, notably in the relationship between patient and doctor, and in matters of clinical judgment. Again, the

profession doubts, and with some reason, the government's ability to "manage the whole thing"; experience with the government's handling of hospital insurance (an administrative nightmare that has lasted for many years in some provinces) and Medicare have not been reassuring in this regard. There are a host of disturbing possibilities that must be faced. They stem largely from the effects of overaction by the profession in defending what it believes to be the essentials of quality of care and of the pressing by the government for economy and efficiency.

And yet we have seen in the course of our searching, distinct signs of good relationship between government and the professions. We have noted too the statements of the leaders of the professions in recent years all displaying an attitude quite remote from that usually attributed to organized medicine and dentistry. To those signs must be added the well recognized position in favour of "reform" of a large proportion of medical teachers and students and of literally hundreds of doctors who have participated actively in committee work, etc., in connection with various planning in the health field. On the government side one notes the recruitment of well trained and effective people whose presence will no doubt be felt and appreciated. These things all point to a brighter future is so far as co-operation is concerned.

**The Public**

The public, as represented by those who have responded to the questionnaires in the formal surveys that have been conducted,[7] seems happy with its present lot. As represented by government or certain groups, it is unhappy and wants something done. The actual position of the majority is not known, nor is it safe to assume that the public, or all parts of it, will automatically back any administratively desirable proposition that is put forward.

## Inhibitors of Change

In searching for reasons as to why certain things that obviously should have been done had not been done, we found that in no instance that we examined was the situation simple. Not infrequently it transpired that the explanation lay with actions of people quite outside the health field.

In various parts of the study, we have noted, for example, the reluctance of the public and of the professions to be "regionalized" or to change their habits. But the list of impediments to change does not by any means end with those posed by the professions and the public. Indeed, as might be expected, considering the slowness[8] of development of the "ideal system" obstruction at many points can be discerned. It is to be found in governments, the departments of which are not integrated in a way that makes easy the implementation of any complex measure (for example, a co-ordinated system or even part of one). The failure on the part of our government today to meld Health and Welfare, is a case in point. Where the jurisdiction of different levels of government (and all, federal, provincial and municipal, are involved in the health care system) rub against each other, things move slowly.

The institutions, particularly the hospitals, as has been noted, have, by virtue of their legacy of independence, been slow to enter into co-operative schemes; nor has it been possible until very recently for them to venture into the realm of ambulatory care or, indeed, anything other than traditional "hospital care" on any large scale, under the terms of hospital financing prevailing in most of the provinces. (See page 83.)

Finally, local economic motives can block an obvious move: it is economics, as we have pointed out above, which keeps open a large number of hospitals in this country which, though small and from a purely administrative point of view inefficient, are still the biggest source of income and jobs in their communities.

### Will the Inhibitors Continue to Operate?

This description of inhibitors to change is depressing if viewed apart from the current attitudes and actions previously outlined. But, as we have tried to convey in this section, there are forces at present that, gaining strength, could bring about, in a relatively short time, reforms that have been urged hesitantly for so long. Never before have the governments been so committed or so well equipped to act. Never have the universities responded to a call for action in this field as they are now doing and never have there been so many in the health professions determined to improve the lot of those they serve.

There is, indeed, a ferment in the country, an attitude to change that can lead to good things.

## Competence

Next to be considered is the competence of the people in the health field. This is related to the calibre of those who enter it, the quality of the instruction they receive, the extent to which they are inspired to perform well, and the opportunities that they have, and seize upon, to maintain their interest and continue their education.

### Calibre and Type of People Entering Health Professions

Speaking generally, medical and dental schools have, for many years, laid down fairly rigid academic requirements of applicants for admission, and from those eligible the choice has been made almost entirely on a basis of marks, especially in Physical Sciences subjects.

It is said that this has led to the build-up of an academically-oriented profession, insensitive to the needs of the people. This may or may not be so; but the move to liberalize admission policies is clearly underway and the results will be interesting to see. The new policy (adopted in various forms in several places) gives credit for motivation and experience which take their place beside, and sometimes displace, academic experience and performance as the criteria for admission. This permits the acceptance to medicine of people heretofore denied. Dean John Evans described the policy in the Faculty of Medicine at McMaster University as follows:

"Another aspect of mobility is the broadening of admission requirements

to highly sought after fields of health education such as medicine. Until recently nurses or social workers who subsequently decided they wished to enter medicine were effectively excluded because of lack of sufficient depth in training in chemistry and biological sciences. Now admission requirements have been broadened, at McMaster, so individuals with established learning ability and favourable qualities of character may enter medicine directly without the normal academic requirements in physical and biological sciences. This opens the medical door much wider to other health professionals. It also serves as a means to offset the forces of academic competition which deny admission to highly committed individuals whose earlier formal educational opportunities have been handicapped by ethnic background, poverty, or inadequacies of the educational system in the remote geographic areas in which they have lived."[9]

Will these people with different, or lesser, academic pretentions be more or less competent to practice medicine than their predecessors? Will the standards of medicine be undermined by this quality? No one can answer these questions, but the chances are that if choices are carefully made (as they undoubtedly will be) there will not be any lowering of standards and the ranks of the practitioners will be strengthened. An important potential by-product is the effect that such a plan may have on the calibre of people enrolling in the other branches of the health profession who, as Dean Evans pointed out, will not be closing the door on the possibility of entering medicine at some later date.

As has been noted previously, there is a highly significant change being effected in *nursing education*, with the gradual withdrawal from the traditional program in the teaching hospitals in favour of a combination of formal courses in a College and relatively little practical experience in hospital. The effect of this new plan (which now involves approximately 25 per cent of the nurses in training) upon the calibre of the recruit cannot be known yet; but it is clear that one of the reasons for making the change was to attempt to attract the highest possible calibre of candidate, for it had been observed that numbers (and perhaps quality) of applicants to nursing schools were dropping off.

*Research in Health Care*

Research in health care has been relatively neglected. As the need for evaluation of the different forms of health care, for studies of demand and supply, indeed, for scientific appraisal of all aspects of the health care system becomes more pressing, the necessity of attracting able people into this field is great. Some steps in this direction have been taken[10] in a number of universities which are now offering graduate programs in this area. The precise number of students registered for Graduate degree programs whose work lies in the area of health care is not known, but is judged to be approximately one hundred which represents a fair start. It can be expected that the number of candidates will increase because undergraduates in medicine and other faculties are showing an increasing interest in Biostatistics and Epidemiology and it is likely that many of them will elect to pursue this interest in their later career.

*Quality of Teaching*

So various are the details and so numerous the innovations that it is quite impossible to make any assessment of the standard of teaching in our medical, dental and nursing schools. We can only remark upon the trends that we see and give our impressions as to their significance.

The first to be noted is that of the increasing interest of both teachers and students in reassessing what, how and why things should be taught and in redefining goals. This is a healthy trend, and even if it should turn out that the modern goals are the same as those set in the time of Hippocrates or Florence Nightingale, students and teachers will be better off for having thought about them. Of more immediate importance than the goal setting are the efforts being made to find the core of knowledge that all students should master no matter what their eventual niche may be, to present this core in the most easily assimilable form (thought to be in the "systems" approach) and otherwise to encourage the student to follow his own bent, to choose, from the elective studies open to him, those that interest him most and from which, therefore, he will derive the most benefit. The objective, clearly, to produce a well-motivated, multipotential student with a real taste and a capability for tackling problems and for learning, is admirable: considering the enthusiasm with which it is being pursued it may well be reached.

We see, then, a trend in many of our schools to replace the traditional, relatively fixed and formal, scientifically-based regimen with a much more flexible system in which the student can, to a very great extent, determine the course that he will follow. A new option widely open to the medical student, and often strongly urged, is to concentrate heavily on the problems of Family Practice. This, too, is good: it should lead to the closing of a well-recognized gap in our pattern of medical education.

No fault is to be found with these trends. No one is likely to contest the view that medical education was becoming too stereotyped, too oriented to the scientific as distinct from the service aspect of medicine, too specialized. Few it must be, who do not welcome the direction that things are now taking. But if the direction is right there remains the question of distance. There is a popular movement – a fashion – to downgrade scientific medicine and to denigrate the hospital as a place where students are given a false impression of medicine. Useful as these stances may be for promotional purposes, they harbour some real dangers that may materialize if things are carried too far. Two of them are of particular importance.

First, the training of the student may suffer if the role of the hospital ward as a teaching vehicle is underplayed. There may be, indeed there is, a substitute for formal teaching; but there is none for experience and the experience that can be gained by a student while examining and following through his or her own and others' patients in a hospital, and seeing the results of methodical investigation and carefully-planned treatment of a wide range of conditions cannot be gained anywhere else in so short a time. Perhaps never again in his or her life will a student have such an opportunity, and, lacking it, he or she may not establish those habits of thought and procedure which could be so valuable in his future discipline.

It may be that the elective system will save the situation, that those who

can profit most by hospital training will find it for themselves, and that the others will do better in the many alternatives that are now open to them than they would have done if forced to spend most of their undergraduate clinical years in hospital. But there still lurks the very real possibility that students may be lured by the great attractions of the Family Practice Units, the Community Clinics, the Practitioners offices, etc., and spend so little time in a hospital ward that they never really learn the discipline of history taking or physical examination. This fear would be unfounded wherever appropriate standards of excellence in diagnosis and treatment were developed for ambulatory health care so that the teaching of students in this area would be just as rigorous as it now is in the teaching hospital ward.

Second, existing centres of excellence in clinical work and research might be harmed. It is an undeniable fact that for many years the greater emphasis has been laid on the biological aspects of medical science and on technical specialization, and all too little scientific attention has been devoted to the organization of health care and to the social faults that play such an important part in the undermining of health. It does not follow that to correct the situation, the process should now be reversed. Facilities for the training of highly-specialized workers in biomedical science and in technological medical specialties must not be weakened in order to promote advance in the neglected aspects of health care science and practice. To do so would be to abandon the enormous progress that has been made in this country in the last twenty-five years during which biomedical research has just reached the point of "pay-off" in scientific contribution, in medical education and practice. Similar progress must now be fostered in these preventive and therapeutic aspects of health care which lie outside the biomedical and technological spheres.

The possibility that these gains may be annulled by an overzealous "new deal" is not remote. Allocation of funds is the key, of course, and doubtless there will be much haggling. Those involved in it should bear in mind that a system characterized by good primary and poor specialist care would not be desirable and that to undermine the support of biomedical science would have a poor effect, not only on specialist care, but on primary care which is based upon biological as well as social science. Balanced support of the social and the technological sides of health care is what we need, not a swinging of the pendulum from one to another.

*Nursing Instruction*

The quality of instruction in nursing is no easier to assess than that in medical schools, particularly due to the fact that such great changes in technique and programming are in the process. It is noteworthy, however, that a serious effort has already been made to judge the merits of a new system[11] – a task fraught with difficulty but one which should be undertaken in other fields.

**Maintaining Competence – Continuing Education**

We have previously cited as one of the faults in the system the lack of opportunity for practitioners in all of the health professions to continue their education. The lack, it should be observed, has by no means been complete.

Journals, texts, meetings of professional societies, hospital clinical meetings, and refresher courses have been available to anyone who chose to take advantage of them. But until recently the attempts to solve the very considerable problems involved in maintaining the interest and skills of the practitioners over a period of years have been haphazard and, in most respects, ineffective. The Medical Schools have now entered the scene in an important way. Each of them has a Department of Continuing Education with, in some cases, a fulltime director. A wide variety of programs is offered: courses of varying length, individual tutorials, visiting teams, etc. Indeed it can now be said that a co-ordinated program is being developed in each province. And as experience is gained and attempts are made to evaluate the courses, certain opinions are emerging.

*The Refresher Course*

It is generally conceded that the value of the standard "refresher course" lasting two or three days is not great. Nor can it be expected that slide shows, films, radio and television courses, interesting and useful though they may be, will have a profound effect. Some of the areas that are now being explored and in which, it is hoped, further development will take place are as follows:

*Peer Review*

There can be no more effective educational process than Peer Review: in connection with a "medical audit", be it in a group practice or a hospital, a review with one's peers of the work done, involving frank discussion of errors and analysis of cases of interest, is invaluable.

A related exercise is being studied[12] in which a team of experts studies the case records in a hospital, identifies areas of weakness and designs a course specifically for the staff of that hospital.

*Visiting Teaching Teams*

Regular visiting teams from a university to regional hospitals give courses and hold discussions on subjects suggested by, and in a manner planned in cooperation with, the local group. In fairly extensive experience with this method those responsible for it have become convinced that active participation of the "students" in this way has played a vital role in the sustained success of these courses.

*Prolonged Courses in Hospitals*

It seems evident that a periodic return to the hospital or clinic for a suitably long period (two or three months) would be the ideal form of continuing education. Freed from their practices doctors could devote their full attention to learning and, given suitable arrangements in a hospital or clinic (which should be easily effected) they would be in the best possible position to make up whatever they had lost or missed in their years away. Where doctors are practising in sizable groups it can be arranged that at any one time a member of the group can be away being refreshed. The colleagues fill in the gaps that are left, and neither the extra work for each nor the cost is great. In smaller groups and in the case of the solo practitioner it may be

virtually impossible for a doctor to arrange to leave his or her practice to take a prolonged course.

Some interesting trials have been carried out in which teams of students and interns from hospitals have "taken over" a practice to, it is said, the satisfaction of everyone concerned while the doctor was away. It is conceivable that the method might be widely adopted although the arrangements are likely to be difficult.

*Self-Assessment Programs*

Of very considerable interest at present are the self-assessment programs of the American College of Surgeons and the American College of Physicians. These objective type examinations which are increasingly popular may well assume an important place in continuing education and possibly as a test of a doctor's competence. It is important to determine whether or not they can be used for the latter purpose.

All the above described formal methods can be valuable, and all should be pursued. They must not, however, be allowed to disguise the fact that the best form of continuing education is that which occurs – or should occur – daily in the life of every doctor in the form of discussion of problems with colleagues, consultation with experts, hospital clinical meetings, and private reading of the literature. It can be said that the main purpose of formal continuing education programs is, as in undergraduate education, to stimulate the doctor to educate himself.

It is clear that those involved are just beginning to crack the surface of the problems of continuing education. A good start has been made by the establishment of machinery in the Medical Schools for stimulating, organizing and co-ordinating the work in this area. But there is a long way to go.

There still remains a lot of co-ordinating to do. Medical Schools, Medical Associations, Specialist Associations, Hospitals, etc., are all involved and the proper liaisons have still to be worked out in most places. Ways must be found to encourage a much higher proportion (and it should be 100 per cent) of practitioners to participate. An important aspect of this, it should be repeated, involves the question of covering the doctors' practice while they take a course.

*Recertification – A Test of a Doctor's Competence*

There is a great deal of controversy about the necessity for, and the practicality of, subjecting doctors and dentists to periodic examinations in order to determine their continuing fitness to practice. It is usually pointed out that it is inconsistent and unreasonable for Licensing Colleges to be so meticulous in the first place in examining and approving the credentials of those to whom they issue licences to practice, and then so unconcerned (unless there are complaints) about their performance in the years that follow. And the questions naturally arise. If, as should clearly be the case, it is the Colleges' responsibility to protect the public from inadequate, improper or unwise practitioners, are they discharging it fully? Is it sufficient to wait for complaints, as has traditionally been done, or should there be positive action to assure that all those practising are competent?

It is, we feel, a reasonable presumption that practitioners, over a period of time, lose part of their capacity to practise well unless they are constantly refreshed. In the Canadian setting this is supported by the findings of Clute (the only available objective evidence on the performance of Canadian doctors) that in 1963 the quality of practice of older doctors tended to be poorer than that of their younger colleagues.[13]

One cannot say how far this applies now. Undoubtedly it is common, perhaps usual, for doctors to remain alert, to take advantage of whatever experience has to teach, to offset what they may lose by advancing age with what they gain in wisdom, but it is equally certain that this does not occur in all cases, and it is with that unknown number who deteriorate that those who advocate recertification are concerned.

Why, they go on to ask, should not a doctor's capacity to perform be tested regularly, as is that of an airline pilot? Surely the nature of their responsibilities for protecting the lives of people are not dissimilar; should not both doctors and pilots be able to meet high standards of performance throughout their working lives? Of course they should. And the answers to the other questions posed above should, in our view, make it clear that physicians are not being active enough in this field.

Accepting then, as we do, the principle of periodic review, one has to consider the various ways in which it might be carried out. The analogy with the airline pilot weakens at this point. In his case a thorough physical examination, some laboratory tests, and an exercise on an instrument panel usually suffice. The doctors pose a more complex problem; for their competence – or incompetence – is much more diffusely and intangibly expressed. What is it that one would be looking for in a "review"? In responding to this there are at the moment two key issues to be examined: First, what goes wrong and second, how can one tell for sure?

There is a great temptation in these days when the "explosion of knowledge" is at once an expression of pride and horror to attribute a doctor's failure to the fact that he or she has not "kept up". The half life of medical knowledge is ten years or less, we are told, and we shudder and wonder. Unquestionably, the half life of some forms of medical knowledge is short, but we have no doubt that the knowledge or, perhaps better, the skills required to practise good medicine are much more durable. Again to quote Clute:

"The figures and the clinical examples that we have given make clear that an appreciable percentage of the practices visited in each of the two provinces were seriously deficient in quality. We must emphasize that the deficiencies to which we refer were *not* lack of knowledge of the details or recently discovered drugs or lack of familiarity with the abstruse complexities of rare diseases. The deficiencies were in the fundamentals of clinical medicine – failure to take an adequate history, i.e., failure to gather and to make use of the information that the patient himself could provide about his disorder; failure to perform an adequate physical examination and, in some cases inability to distinguish between normal and abnormal physical findings; failure, in the investigation and the treatment of cases, to think in

terms of basic principles of biochemistry, physiology, pathology, microbiology, and pharmacology"[14]

This deficiency in the application of the fundamental skills of practice is, as every experienced consultant will attest, "what goes wrong". It can be suspected, in a doctor, at a glance or in a brief encounter, but it cannot be established for sure except by a thorough examination of the doctor and by observing his actual performance at work: a point stressed by Clute.

If it is to test the application of fundamental skills of practice or, in other words, the performance that is required when a decision is being made about recertification, one can say at once that the traditional form of examination (the "written and oral") is quite inappropriate. Whatever value this type of procedure may have in testing for knowledge or facts, it has relatively little in testing judgment and none in judging performance under ordinary conditions.[15] With this standard and easily managed form of review ruled out one turns to the other obvious possibility the "thorough examination of the practitioner at work". But, it is at once apparent, if the testing is to be as thorough as it needs to be, examination of all physicians in this way would be virtually impossible from a practical point of view.

## A POSSIBLE METHOD

There remain a number of other possibilities – none without flaws. Indeed, it is unlikely that any wholly satisfactory method will be found, for however precise and careful the examination may be, the scrutiny that it entails is bound to constitute an invasion of privacy of the doctor and the patient which is always distasteful and potentially damaging. But the possible bad consequences of these invasions are, we believe, incomparably less than those of unchecked practice. Studies of medical records in the course of a medical audit, the reviews of complications and deaths on the wards services, the introduction of tissue and infection committees, all of which are now common practice in well run hospitals were greeted at their inception with considerable suspicion by some. Privacy has indeed been invaded but, so far as we can determine, there have been no ill effects to offset the very marked benefits that have accrued.

In a previous section of this study [16] we have urged that every effort should be made to check on the quality of work done in every part of the health care system. We pointed out that there are ways (imperfect, to be sure, but still of considerable value) of measuring the quality of a doctor's work in hospital and that the "profile "gives some hints as to the nature, if not the quality, of work in the office. We believe that these checks should be carried out in every case. If this were done a first step would be taken in assessing the individual's qualifications for recertification.

In summary, we suggest the following which involves in essence the bringing together for consideration by an appropriate Board, all the information on a doctor's work that is now available in many places:

1) That the performance of each doctor in practice be formally reviewed every five years by a Board [17] appointed for each region in a manner agreed upon by the appropriate governments and by the College of Physicians and Surgeons.

2) That the practice of including lay persons on these Boards (as they have been on Complaints and Discipline committees in some of the Colleges) should be followed.

3)That the Board have available to it:

- information from the hospitals in which the doctor has worked: this information would include a report from the chief of the service or services to which the doctor had admitted patients and a report from the medical audit, tissue and utilization committees;
- the results of examination of his Medicare profile;[18]
- a statement from the College of Physicians and Surgeons.

4) If these data cast no doubt upon the doctor's ability to practice he or she should be recertified.

5) If there was a reasonable doubt, a full examination of the work in the office and the hospital should be undertaken.

It is clear that in many respects the method is crude, but with practice it could, no doubt, be refined. The principle of "examining" a doctor on the basis of performance in practice is, in our view, sound; indeed we believe it to be the only way of judging a person for such purposes as recertification.

The data obtainable at present are incomplete, and even when all hospitals have smoothly working medical audits and the "profiles" are more fully developed, they will still be insufficient in the case of many doctors. It may well be that as experience is gained, other types of data or other means of obtaining them, will be found. In the meantime it appears the suggested method might serve for a start.

We are not prepared to suggest a technique by which dentists or other health workers might be examined. We do maintain, however, that the principle of periodic assessment should obtain throughout.

### SUBSEQUENT ACTION

The question as to what actions should be taken in cases in which a doctor failed to meet the standards is one that can only be settled after long consideration and experience. Clearly the choice could range between simple reprimand and withdrawal of license. The intermediate steps would be limitation of practice and some form of rehabilitation. In connection with the latter it is important that the program of continuing education be geared to rehabilitation (as well as to maintenance) in such a way that appropriate courses would be available for this purpose.

## Health Manpower

Few tasks could be more frustrating than that of calculating the manpower needs in a system so amorphous and changeable as health care. In the lists (Research List 207 – 241 in the Supplementary Papers) we have noted some thirty-five studies (of which at least six can be classed as major) currently in progress in various parts of the country that touch upon the issue of manpower. Besides these there are undoubtedly many more being carried out by federal, provincial and other bodies. This represents a very substantial effort in a good cause – finding out how many people there should be at any given time to do the job. In the process of searching for answers much is

learned and the exercise is well worthwhile from many points of view, but the chances, at the present time at least, of making anything like a confident projection in any aspect are remote because there are so many unknowns.

**The Number of Physicians**

In the case of doctors, for instance, questions hotly debated at the moment, as to how many are needed and how the universities should plan, have to be answered vaguely. What is the ideal proportion of doctors to people in a country? The World Health Organization suggests one doctor for 600 people. In Canada there is approximately one for 750, well below the "ideal". Should the sights be set on bringing the ratio to the WHO standards? Possibly. There may be no better guide. But ratios of this sort are very crude measures. They do not take into account a number of factors that are vital to the proper functioning of the system, such as the distribution of doctors; their organization – the proportion in solo as distinct from group, in specialty or non-specialty, practice; the assistance that doctors may have in their practices; the facilities available that may have a profound effect upon their "productivity"; the number of hours that doctors work. Any one of these factors and others may change dramatically within the next few years to throw off the best made plans.

If, for example, the pattern of practice were to change radically – if community clinics were organized on a large scale, if doctors were to reduce their work week to, say, forty hours, if large numbers of Nurse Practitioners were to become available – the need for doctors would alter, differently in each case, but proportionately to the effect that each had upon the output of the system. This effect is as unpredictable as the timing if not the likelihood that the changes themselves will take place.

**The Need for More Physicians**

The importance of considerations of this sort is brought clearly into focus by Reinhardt who stated:

"it may be well to illustrate briefly the potential impact of changes in physician productivity on future physician requirements. At the present time, the size of the annual graduating class from Canadian Medical Schools is roughly equivalent to 4 per cent of the total civilian physician population and to slightly less than 5 per cent of the number of physicians in private practice. It follows that a mere 5 per cent increase in the average productivity of Canadian Physicians in private practice would add more to the available supply of physician services than would the entire current graduating class from Canadian Medical Schools."[19]

If this reasoning is accepted – and it seems irrefutable – it should influence our attitude to the relative emphasis that should be placed upon the production of physicians on the one hand, and efforts to increase productivity on the other. The latter, if it can be achieved, will bring a quicker and better result. But how likely are we to achieve it? And, even if we do, will it be enough?

We can only hazard guesses: our first would be that there will be an

increase of productivity of the system relative to the number of doctors involved (by improved organization and management and by the introduction of Nurse Practitioners). We doubt, with respect to the second question, that the gains here will be sufficient.

Quite apart from the probability that an increase in demand for service will accompany an increase in productivity, there is, as a good reason to produce more doctors, the fact of Canada's dependence upon immigrants to keep up with the number required to maintain service. Since 1966 the number of immigrant physicians has exceeded, by an increasing amount each year, the number of graduates of our own medical faculties.[20] This is patently a serious situation and one which does Canada no credit. It is dangerous to become reliant upon other countries for the supply of medical personnel, because it can never be certain and, as has been pointed out by Dr. John Evans, "... it is doubly unjust to drain skilled manpower from other less well developed countries and at the same time deny the career opportunity in medicine to the abundant number of well-qualified young Canadians who currently seek entry to our programs of medical education."[21]

There is no doubt that the Canadian output must be increased. But by how much? The projections cited by Nelson-Jones and Fish[22] call for the graduation of 1 483 medical students in Canada in 1977, nearly a 50 per cent increase in an eight-year period but still, probably, not enough to meet the needs.

In these projections a modest increase in the output of each of the medical schools is visualized. It is likely that a considerably greater increase could be made in most if not all of the schools without disrupting the standards of instruction. We believe, thus, **that to effect the maximum increase in each Medical School should be the first objectives.**

The other possibilities that have been advanced in so far as medical schools are immediately concerned are, first, to establish more of them and, second, to shorten the course in order to graduate more in a given period of time.

As to the first, we consider that the necessity of taking this enormously expensive step is not clear enough to justify it. We do not know yet what can be achieved by way of enlarging our present schools[23] nor can we foretell the results of whatever reorganization or reassignment of tasks are to be made.

On the second point it should be observed that shortening of the course s being considered by several schools. There is no magic to the standard four year course (which used, in some schools, to be five years) and it is highly likely that some, and perhaps all, students could acquire sufficient knowledge and skill in less time than is now required. We have already noted that all our schools are now in the throes of experimentation in a number of techniques, some of them involving a shorter period in medical school. We believe that the decision as to whether or not a general reduction should be applied must be made essentially on academic grounds. The need for increased numbers of physicians has, inevitably, a bearing, but reduction must be pressed only if it can be shown that academic requirements can be fully met. We have certainly not reached that point yet.

**The Geographic Distribution of Health Personnel**

The distribution of health personnel follows naturally that of the population in general. For most parts of the country there is little precise information, but it is accepted that there are underserviced areas in several provinces (Newfoundland and New Brunswick and some parts of Northern Ontario are said to be or to have been the most shorthanded) and in some sections of the larger cities.

The underserviced areas can be divided into three types – for which three distinct solutions are required and are actually being tried.

*The Isolated Regions* such as the Far North, where the population is widely dispersed, are being serviced by "special arrangements". We have given some description of the outpost nursing and regional hospital plan in the Far North (page 75). Other types of arrangements that we see in the country are operated or inspired by universities. Prominent amongst these are the Sioux Lookout project operated by the University of Toronto and the Churchill project by the University of Manitoba.

It can be said that a very reasonable attempt is being made to develop practical ways of providing medical care for the people in these regions. Where they remain primitive, what is being done now in the places covered, is perhaps enough. Greater problems develop where "civilization" begins to creep in to interfere with the traditional life of the people and to expose them to new diseases. Further study, partly medical but mainly sociological, is needed here.

*Remote Areas* are those at some considerable distance from but in communication with urban centres. Many are small communities, not large enough or well-enough organized and not ideally situated to attract a doctor but, in fact, large enough to sustain one or more doctors.

In every province there are communities of this sort and various ways and means of supplying doctors to these regions are being tried. Of these by far the largest, most concentrated and successful scheme that we have encountered is that being carried out under the program of Physicians for Designated Areas (Underserviced), operated by the Department of Health of Ontario. This program was instituted in October 1969. Areas numbering 121 have been designated as underserviced for physicians and it was determined that 167 physicians would be required. In February 1972, approximately two years after the program actually started, 82 program physicians were in practice, 13 doctors had been accepted but were not yet on location: 61 of the designated areas had physicians (some more than one) and 60 were still without program physicians.[24]

A steady supply of applicants continues and a large reserve is building up in the Medical Schools as a result of the provision of bursaries for medical students in return for an undertaking on the part of the student to practice in areas of the province acceptable to the Minister of Health, for one full year in return for each academic year of bursary assistance.[25]

The early experience in so far as the new doctors fitting in and staying in their communities has been satisfying. Particular attention should be directed to some of the elements of the plan that appear to have made it work so well.

In the first place the communities that felt themselves to be underserviced and asked for help were carefully studied. Only those truly underserviced were then placed on the list. A careful inventory was made of the available facilities and the socio-economic factors that would be of assistance in helping to select a doctor for a community, and would be of special value in guiding the prospective doctor and spouse who could then see at a glance what schooling, sport facilities, music lessons, social clubs, etc., were available.

The community is required to supply good accommodation for the doctor's office and this, because it ensures a commitment on the part of the community is regarded as a vital factor. In some cases suitable offices were already available; where they were not the community was required to build. So far (February 1972) 28 new buildings had been erected for this purpose, financed in a variety of ways, by individuals or small groups as an investment, by contributions raised by a service club, by bond issue or municipal tax.

Close contact has been maintained between the Department of Health, the community and the doctor – an absolute essential. Many problems have arisen that have been solved by prompt intervention. The financial guarantee made to the doctors is one of the basic features of the plan. The $26 000 minimum net income guaranteed originally has been increased to $28 000 for most of the province and $33 000 for some posts in the far northern sections.

The outstanding feature of this program, and the lesson to be learned from it by all those concerned with the provision of care, *is the attention to the details that affect the person.* The community representatives are thoroughly consulted about the community's needs and the sort of person they would like to have; the doctors and their spouses know a lot about the community before they go to look at it, and on their first visit they meet the people with whom they may come in contact. The community, by having to raise some money to provide space, becomes thoroughly interested and helps to make things work.

*Urban Areas* are the most difficult problem at the present time. There are areas in larger cities where people do not, for one reason or another, receive the care to which they are entitled. As the entrepreneurial system of providing ambulatory care has developed, it has left serious gaps in both country and city; the latter, in point of numbers of people involved, constitutes the more serious problem. Outpatient departments of hospitals, to which practically all have access, have not filled the gaps. In general the services that they have offered have not satisfied either the needs or the desires of the people. If their nature is not fully understood, these faults are recognized and a serious attempt is now underway to determine the best means of correcting them. In July 1971 a special committee was appointed by the Minister of Health to "study and make recommendations on the delivery of ambulatory care at the community level through various types of Health Centre and the possible role which governments and others play in the encouragement of such centres".[26]

While it will be dealing with the whole field of ambulatory care the Committee will undoubtedly be particularly concerned with the urban

problem. The question of Community Clinics or Health Centres is one of great current interest. The extent to which they should complement or replace present methods of practice can certainly only be determined by an extensive series of major trials, carefully evaluated. An obvious place to start is in a deprived region in the heart of a city. The Canadian experience in this area, while not negligible by any means is not nearly extensive enough yet to warrant any conclusions.[27]

**The Distribution Within the Medical Profession**

Canada's medical manpower is almost equally divided between those classified as specialists and those as non-specialists. No one knows what the proper ratio between specialists and non-specialists should be. It is strongly suspected that Canada's proportion of specialists is too high.

*The Family Physician*

One way of redressing this suspected imbalance that is being actively pursued at the present time in Canada is to increase the number of non-specialists – in particular family physicians. This is being effected by a change in policy in the Medical Schools (page 63) and by serious efforts to raise the status of the family physicians by defining their role and limiting it to things that they can handle better than others, by raising the status of family practice in the hospitals (in most of which family practitioners participate in the medical administration), and by extending the role of the family practitioner in the teaching program of Medical Schools.

The College of Family Physicians has been active in seeking ways to raise the standard of competence of family practitioners. All these moves, of relatively recent origin, are to be applauded and encouraged. There is no information available yet as to their effectiveness. We have not been able to discover whether or not more of the recent graduates are going into family practice than previously. Lacking relevant statistics which should be available, we have the impression that an increasing number are doing so.

One caveat should be entered at this point. It concerns the danger that financial inducement may lead too many recent graduates into practice before they have had optimum training; that, in fact, the efforts to fill slots in the practice field will work against those aimed at maintaining quality. It is probable that the natural desire of a sizeable proportion of graduates to learn more will counteract the financial carrot but the situation should be closely watched.

*The Number of Specialists*

The other factor in the specialist/non-specialist ratio has received little attention. So far as we can determine no serious study has been made in Canada of the number of specialists that are required. Nor is it easy to devise a way of determining how many in any particular specialty are needed for the country as a whole. Some moves have been made in the United States to determine this point. The evidence from some preliminary studies suggests that a considerable proportion of highly-trained surgeons spend a good part of their time doing things that a much lesser-trained person might do.[28]

This is an important matter. If it is true that we have too many specialists in any of the specialties, we should know about it and be prepared to find some means of regulating the supply. At the present time there are few barriers to the qualified individuals who want to enter a specialty. If they cannot find a place in a training program in Canada they are likely to be able to find one elsewhere. Besides this there is no check kept upon the number of specialists immigrating to Canada; nor could we consider limiting immigration in special categories until we were prepared to limit our own output. The only suggestion that can be made now is that we set about to establish the facts of the situation. The work must be done by somebody. In our view the Royal College of Physicians and Surgeons should lead the way in promoting studies.

It has been suggested that one way to increase the number in non-specialist practice at any one time would be to require that all doctors before entering specialty training spend a given period of time in family practice. This suggestion has merit and should be seriously considered in "general" specialties, for example, general medicine and surgery and pediatrics. The plan could not be applied across the board because some intending specialists are not qualified by interest or aptitude for family practice, but for those practising in a broader specialty, experience in family practice would be invaluable.

We have introduced above the possibilities of shifting professional roles in order to increase the efficiency of health care delivery. It has been suggested that the number of specialists might be reduced and the number of family physicians increased and their actual role extended to take up part of what is now done by specialists.

The next move in this shift is to introduce a new member into the team.

**The Nurse Practitioner**

The effect on the manpower situation of the redistribution of roles in the medical profession itself will be long in coming and will probably not be very great in the overall picture, desirable as it may be from all points of view. Of much greater potential effect is the entry of a new person, the Nurse Practitioner[29], into the field of primary care.

In the Soviet Union the *Feldsher* for many years has performed medical tasks and in the United States the ex-corpsman and the specially-trained pediatric nurse have been groomed to take over certain functions from the physician. In Canada we have had some important, if limited, experience along these general lines.

*In the North*, the Department of National Health and Welfare maintains some 60 nursing stations (above the 60th parallel in an area of 1¾ million square miles with a population of 46 000) and these are staffed by between 150 and 200 nurses (about 40 per cent of whom come from Australia, New Zealand, U.K., Europe, India and the Caribbean). At each station there is at least one nurse who has had training in midwifery and a general type of practice is carried out with the nurse treating all those conditions he or she feels competent to treat. They are in ready contact with a doctor by radio or telephone and the doctors makes frequent visits, but the calls on their

own judgments and the responsibilities that they shoulder must be very great. It is hard to determine precisely the effectiveness of this program. The improvement in the statistics of infant and maternal mortality in the Territories is impressive,[30] and it can be said that from all that can be observed the judgment exhibited by the nurses is sound, the general standard of work is very good and the program is increasingly effective. It was inaugurated in 1945 and has been modified considerably since – most recently in 1967.

*In Industry* the experience is also long: indeed, the concept of the role that nurses might play in, at least, industrial medicine, was developed nearly twenty years ago. In speaking on this subject in 1956, D.C. Bews reporting on his experience in Canada stated, "It has been our experience that most of the job can be done and probably can be done best by our Nursing Staff, through their participation as full-fledged members of the medical team. I feel certain that if we are to succeed in this branch of medicine, we must learn to respect the Nurse as a co-worker, must give her adequate support and training so that she may effectively carry out the work assigned to her and must recognize that a Company's health program will flourish or fail depending upon the type of teamwork and understanding which is established between the Physician on the staff and the Health Nurses, and between the Health Nurses and the employee body."[31]

Over the years the role of the forty nurses (most of whom have had Public Health training and V.O.N. experience) in the health team of this company with 40 000 employees, has steadily expanded to a point where the nurses now carry out all preplacement examinations (referring 5 per cent of the female and 10 per cent of the male applicants to a doctor for an opinion) and most of the periodic health examinations; and they are the first to see all employees reporting sick on the job. In the vast majority of these cases the latter problems are handled entirely by the nurse. The overall opinion of the medical staff and the employees of the quality of work performed by these nurses is unequivocally favourable.

Other instances in industry, in "Public Health", in some hospitals and doctor's offices could be cited but the above is judged to be sufficient to establish the point that we have enough experience in our own country to justify the belief that our nurses can perform perfectly satisfactorily the sorts of tasks envisioned by those who advocate the "Expanded Role".

*Eligibility and Training*

Those who still doubt that anyone but a physician can do properly many of the things that our physicians now do should reflect on the experience of a number of other countries with a lower neonatal mortality rate than Canada's. "In some countries the great majority of pregnant women obtain prenatal care in special clinics, delivery is usually by midwives, and well baby care is given in special clinics. Most of the health care surrounding reproduction is given by non-physicians in a systematically organized but medically supervised manner, yet their mortality rates are much lower than ours".[32]

If this is accepted and if it should be decided to proceed with a plan to develop as many nurse practitioners as possible, several points should be

considered. For example: Who should be eligible and how should he or she be trained? In connection with general medicine in this country at this time, the first part of the question is academic, there being only one possibility – the nurse – for practically no one else has the grounding that is required. And so it may remain. But the possibility should be entertained that in the future the nurse's course, finished with further practical experience followed by some additional training in primary care, obstetrics, pediatrics or whatever, will not be seen as the ideal program; that, indeed, a course designed specifically for the purpose of training an individual for practice will be judged to be preferable. But that, again, is academic; no one knows enough about the job itself and what it will demand of people to design a definitive course.

*Formal Training Courses*

Canadian experience in course design is limited to courses for graduate nurses. The only active formal training programs for "Nurse Practitioners" that we have encountered are:[33]

– A program at McMaster University in which a group of 23 registered nurses working with family practitioners (who are also involved in the educational program) have received full-time instruction for a month, and part-time for the remainder of the year. The overall goals are set forth in detail in Appendix 9 of the Supplementary Papers. The first class graduated in January 1972 and there are plans to expand the program.

– The Dalhousie Outpost Nursing program to which Registered Nurses with at least one year's postgraduate experience are admitted for a two year course. The first year is academic and includes instruction in public health nursing, biostatistics, mental health, nutrition, basic medicine, surgery, midwifery, and pediatrics. The second year is spent in the field where the student is instructed in public health nursing, advanced midwifery; and receives general hospital experience in the International Grenfell Association Hospital in St. Anthony, Newfoundland and eight weeks in Northern nursing stations. To date some 27 nurses have graduated from this program which commenced in 1966. The course enrolment for 1971-72 is nine.

– The following universities have just commenced six-month clinical training programs (the first two of which are spent in an isolated area) for nurses going to the North: Universities of Alberta, Western Ontario, Sherbrooke, Toronto, Manitoba and McGill.

The programs are well designed. Modifications may be required but for the present the goals and the method appear to meet the requirements of:

– the nurse who is to work relatively independently in isolation, and

– the nurse who will be part of a team in an urban or rural community.

So far attention has been focussed on the graduate nurse as the "Nurse Practitioner", and primary care in general medical practice as the field. Thought should be directed to the desirability of introducing more men to the scene and also to other areas in which a similar type of practitioner might be required. Men are not barred by definition, but the fact is that as things stand very few of them enter nursing schools. Possibly with the development of Nurse Practitionership more will be attracted to enter

and the fact that most nursing schools are now based in community colleges may be an added inducement. For reasons of numbers alone it may eventually become necessary to encourage more men to enter this field. But for the time being, and during the experimental period, it is wise to restrict trainees to experienced female nurses.

Besides primary care in general medicine there are many other branches in which a suitably trained person might perform functions equivalent to those of the Nurse Practitioner. Indeed there are possibilities in each specialty. One area, Mental Health, stands out in performance. The argument for extending the training of psychiatric nurses so that they might perform psychodiagnosis and psychotherapy, is well developed by Hanly.[34] He recommends full doctoral (PhD) training. In the light of experience in other fields and bearing in mind the tremendous need for workers in the mental health area one wonders whether such extensive training is required.

*Some Practical Problems*

There is a series of questions concerned with the "practicalities". For example: How will the nurse practitioners fit in to a clinic or a doctor's office? How will they be accepted by the public? How will they be paid? Who will insure them? What will be their legal status in so far as practice is concerned?

With the experiences described above in the North and in Industry, and that gained in trials [35] which, although still in progress, have answered some questions, we need not be seriously concerned about the nurses fitting or their degree of acceptance. It cannot be expected that nurses will be accepted readily everywhere by all patients – or all doctors – but with persistence these difficulties can readily be overcome.

The questions of payment, legal status and insurance are not so easily set aside. Indeed, doubt about any one of them could very well delay or prevent progress in carrying out the experiments that need to be carried out if we are ever to know how best to select and train the nurse practitioner and determine what levels of responsibility he or she can most effectively assume.

In connection with payment for nurse practitioners working with a doctor, one has to ask: Should the nurse practitioners be paid a fee for each service they perform? Should they be paid a salary by the doctors with whom they work, and if so, how are the doctors to be reimbursed? At present, Research Grants and a variety of devices are used to pay these nurses on "pilot projects" and the situation is plainly unsatisfactory. But it will take time to determine the role that the Nurse Practitioner will play and the best method of payment. Meanwhile some form of temporary arrangement must be made.

Where the nurse functions as an employee of the government or industry, there is an established practice of payment by salary. Difficulties arise in the case of those working in doctor's offices. If the full potential of the nurse practitioner is to be developed extensive trials must be carried out there. With experience gained in methodical studies, it should be possible to determine in a relatively short space of time a precise job pattern. Once this is done, the method of paying the individual who does the

job should be easily worked out. Until then, all arguments about the method of payment will be baseless. But arguments there will be and the fear exists that they will spoil the trial.

The questions of legal status and responsibility are also thorny. Studies have been undertaken to establish statutory provisions that will embrace all areas of medical practice in which a doctor may be assisted by a non-medical person.[36] Here again, time and experience will be required to reach suitable conclusions and the necessary trials may founder as a result of indecision. Some temporary but secure means must be found of paying and protecting these nurse practitioners. The method that we recommend is that the Government employ graduates of the Nurse Practitioner training courses and second them to clinics and the offices of doctors who would enter into a prearranged program of trial and evaluation.

*Conclusion*

We regard the development of the Nurse Practitioner as one of the most important steps that can be taken now. We have no doubts that the experienced nurse practitioner can perform a very substantial, although at present unmeasured, part of the work that a doctor now does. The effect that the introduction of large numbers of nurse practitioners would have on the cost of health care is unpredictable. Theoretically there should be a considerable saving because we would need fewer physicians; the nurse practitioner would command a lower salary for doing things that the doctor now does. In practice it might turn out that the demand for the previously unavailable services that they offer would take up the whole input and the need for more doctors would not be decreased. We regard this as unlikely, but we feel that it cannot be ruled out as a possibility; hence we consider that the prospect of cost reduction cannot be advanced as a reason for introducing "Nurse Practitioners".

The main reason, as we see it, is to improve service. Time and again in our survey we have encountered gaps in the service to patients, principally in the area of primary contact, that are not filled at present and that we believe are unlikely to be filled even if the number of physicians is greatly increased. We would urge that full support be given to programs of training and to the development of a corps of Nurse Practitioners.

**Paramedical Manpower**

Numerically doctors, dentists, nurses count for relatively little. The number of people involved in the health field is enormous: 5.21 per cent of the labour force at the last estimate (1961) and undoubtedly rising rapidly. These health workers can be placed in many different cateogries.[37] Speaking on the subject of Health Manpower Policy, Thomas Boudreau said:

"From what has been said so far, it appears futile, not to say impossible, to try to forecast, in quantitative terms, the needs for each category of health manpower. Indeed, it is impossible to foresee *all* the technical and organizational innovations that will be implemented in the next ten years and for those about which some information is available, the rhythm of implementation and especially the effect on manpower are usually not

known. In fact, the final and net effect is very often guessed beforehand. For example, a technical innovation designed to reduce the utilisation of personnel very often results in an increase of personnel because the innovation becomes an occasion to offer new, better and additional services and often produces an increase in the utilisation of complementary services. Again here, we can give as example the automation of laboratories which has resulted in the production of more and better laboratory tests and also more complementary diagnostic and therapeutic services.

If we add to these considerations the fact that the same health services can be rendered or that the same objectives can be realized with many different combinations of resources or programs, so permitting an adaptation to changes in the relative efficiency or scarcity of the resources, including manpower, it *then really appears meaningless to try to forecast exactly the number of persons which will be needed in each category of personnel in five or ten years and to develop programs in order to produce exactly the numbers that have been forecasted.*

In the light of all these considerations it seems that the basic ingredient of a manpower policy in the health industry ought to be *flexibility*. The flexibility to be aimed at should permit and encourage horizontal and vertical mobility inside the health industry as well as mobility between the health industry and the other sectors of the economy. The flexibility to be developed should also introduce possibilities and incentives for redefinition of job contents as well as redistribution of tasks. In other words it should provide a continuous dynamism in the manpower structure and a possibility for the manpower to adapt itself easily and rapidly to structural, technical and economic changes.

In order to develop more precise elements of this general policy of flexibility, it is interesting to look rapidly at some of the factors that contribute to the present rigidity of the health manpower structure."[38]

The factors that Boudreau mentions above are:

1) The formal system of education – he points out the necessity to broaden the base of formal teaching in order to prepare individuals for a whole family of occupations instead of one narrow specialty.

2) On-the-job training mechanisms – he points out that institutions should develop a systematic training system to permit personnel to gain specialized knowledge in different areas as situations change.

3) The hospital budget system which on a line item basis leads to great rigidities. He points out that some provinces have started to use global budgetting.

4) The collective agreements – rigid job description inhibits flexibility.

5) The professional corporations – in Quebec there are twelve such professions. "At any rate some of the artificial barriers to mobility imposed by many professional corporations and some of the claims of exclusivity over certain procedures, in a situation where the institutional context has become more and more apt to guarantee quality has become a costly rigidity which is less and less rational."[39]

# V. Organization in the Health Field

"For in the circuite of the citie, a little without the walles, they have 1 111 hospitals, so bigge, so wyde, so ample, and so large, that they may seme 1 111 litle townes, which were devised of that bignes partely to thintent the sycke, be they never so many in numbre, shuld not lye to thronge or strayte, and therefore uneasely, and incommodiously: and partely that they which were taken and holden with contagious diseases, suche as be wonte by infection to crepe from one to another, myght be layde apart farre from the company of the residue. These hospitalles be so wel appointed, and with al thinges necessary to health so furnished, and more over so diligent attendaunce through the continual presence of cunning phisitians is geven, that though no man be sent thether against his will, yet notwithstandinge there is no sicke persone in al the citie, that had not rather lye there, then at home in his owne house."
—from Sir Thomas More's *Utopia*. Translated into English by Raphe Robynson.

Canadian health resources of people and of institutions have developed in different ways and relate to each other sometimes formally, sometimes in complex informal ways, sometimes apparently not at all. This pattern of relationships has almost always been described as lacking in cooperation and co-ordination. It has been called a pattern of "conflicting regulations, rivalry in programs, competition for scarce personnel and money and intense striving for power and status."[1] This opinion offered some years ago could still be maintained although as may appear below, it might be considerably modified in the light of current activities.

## Governments

Neither the word "health" nor the word "welfare" occurs in the 1867 British North America Act which is the constitutional basis for Canada. These omissions probably reflect the pioneer attitude of having to cope with health and welfare problems on a family or neighbourly basis with the assistance in some places of private charitable institutions, usually religious in origin. The BNA Act does mention federal responsibility for the quaratine of ships entering the country's harbours and for marine hospitals. The Act also mentions provincial jurisdiction over hospitals and charities, but this could be delegated in various ways to municipalities and to local or private organizations.

### *The Federal Health Role*

**Basic Roles**

The federal role in health in Canada has come to include the following:

1) Quaratine and medical aspects of immigration.

2) Matters under the *Criminal Code* including consumer protection from fraud and other harm under the Food, Drugs and Cosmetics Act, and relative Acts. Aside from foods, this protection covers the quality of

drugs, patent medicines, biologics, isotopes, the use of narcotics, the extent of adverse reactions to drugs, and, recently, the efficacy of drugs.

3) Matters concerning international agreements, including water and air pollution under the International Joint Commission established in 1909, and Memorandum of 1925 respecting the safety of exported shellfish.

4) Certain responsibilities for health and welfare care of war veterans, health and safety of federal employees and the inmates of penitentiaries; for sanitation in public carriers (trains and boats), in federal buildings and in National Parks.

5) Certain special aspects of health such as control of bovine tuberculosis and other work of the Department of Agriculture, maintenance of statistics by Statistics Canada, vocational training and rehabilitation including training of disabled persons and the provision of prosthetic and orthopedic services at cost.

*Implied* federal responsibilities include health aspects of treaty agreements and other understandings respecting the Indians and Eskimos and the establishment of national health goals and standards as well as the assessment of their achievement.

*Special implied* federal reponsibility in all of the above examples is for the maintenance of laboratories and hospitals, as required, and for associated research.

Since the Old Age Pension Act of 1927 there has been a steady increase in the number of "shared cost" programs, each specifically worked out between the Federal and various provincial governments.

1937 – Old Age Pension Act extended Federal-Provincial cooperation and sharing to the needy blind.

1942-44 – Discussion on Health Insurance.

1948 – National Health Grants Program.

1952 – Blind Persons Act, Old Age Security Act, Old Age Assistance Act.

1952-61 – Federal-Provincial Program of Vocational Rehabilitation.

1956 – Unemployment Assistance (BNA Act Amendment of 1940).

1957 – Hospital Insurance and Diagnostic Services Act.

1965 – Canada Pension Plan, including provision for disabled persons.

1966 – Canada Assistance Plan, designed to replace some of the above Acts; includes possible full health care for those in need (not necessarily just financial need).

1966 – Health Resources Fund Act, for assistance in buildings for training and research.

1966 – Medical Care Act.

**Co-ordination and Stimulation**

The Federal Government has acted as a *co-ordinator and stimulator* through the terms of its cost-sharing programs. For the most part beneficial and instrumental in spreading major advances (for example, Medicare and Hospital Insurance) across the country, these programs have certain rigidities which have been unfortunate from the point of view of the proper development of the system. For example:

– The cost-sharing program for hospital construction confines, to all intents and purposes, the funds to the building of acute hospital beds. It is

quite evident that had the provinces been able to use this money for other purposes, they might well, in order to have rounded their systems, have built chronic hospitals, rehabilitation and convalescent centres, etc., at considerably less cost. The effect, however, while unfortunate in some respects has not been wholly bad because there is now a good complement of hospital beds in the country.

– The cost-sharing Medicare program permits payments only to doctors: none of these funds so far can be used for other workers in the field and this has to date inhibited the progress of some experiments in providing comprehensive care.

– The rigidity of the method of financing the operation of hospitals restricts experimentation in new methods.

**Convening of Meetings**

A federal Department of Health has been in existence since 1919 at which time a co-ordinating body called the Dominion Council of Health was established by law. Its membership is primarily composed of the Chief Medical Officer of each Province and of the federal Department, usually called the Deputy Minister of Health. In addition some non-government members may also be appointed. This Council has met regularly since 1919, primarily to discuss Federal-Provincial interaction on health matters and, hopefully, to achieve some agreement on major items.

With the formation in 1944 of the Department of National Health and Welfare, there was a marked expansion of the professional health staff at the federal level to advise and assist provinces in such areas as nutrition, industrial health, dental health, mental health, tuberculosis control, hospital design, blindness control, and research development. As federal money became allocated to special grants for the improvement of health services and the Hospital Insurance and Medical Care Insurance, there was an active interaction, at all levels, of federal and provincial personnel. This interaction was partly formalized in committees on various subjects such as nutrition, maternal and child health and mental health, in which the appropriate provincial and federal officers met to discuss program development. These committees usually include a number of professional but non-governmental specialists in the subject. Legally these committees advise the Minister; by custom they report to the Dominion Council of Health.

When the Hospital Insurance and Diagnostic Services Act came into force in 1957, a separate federal-provincial group was established to discuss this subject alone. Some of the provincial Deputy Ministers of Health are in charge of hospitals and sit on the Hospital Committee as well as the Dominion Council of Health, but not every province was organized in that way, so differences in membership and outlook have arisen. Similarly the Medical Care Insurance discussions are not always held by the same personnel as sit on the Dominion Council of Health. With the development of welfare programs that have a health aspect, such as for blind or disabled persons or those receiving social assistance, the federal health picture has been even less co-ordinated.

In addition to the above professional discussions, the 1960s saw an increase in the number of other federal-provincial meetings affecting

matters related to health. These include meetings of Prime Ministers and Premiers, of Resource Ministers, and others. Not always has a clear health voice been present or consulted at these meetings yet the arrangements discussed and any consensus reached often affected Health Departments. The trend is noteworthy toward straight financial arrangements, less professional consultation and advice. The rights of each province to go its own way in administrative arrangements for health services and also for welfare services is being increasingly asserted and followed. Even the obvious federal role to establish national standards or guidelines and to assess their achievement, is not clearly asserted in the complex situation that exists today, both within provinces, and between provinces and the Federal Government. Certain legal requirements such as portability still give rise to arguments, mainly about residence requirements.

There are many committees concerned with one or more aspects of health care. They provide a framework for federal-provincial discussion from the highest political levels through various professional levels. They may meet regularly or rarely. In general, owing to legal and organizational complexities, it is not possible for any of them to achieve a comprehensive review of what is happening in health services in Canada, nor to achieve uniform action on any consensus that was reached. Of special significance in the present situation are the actions of the Department of National Health and Welfare in two particular connections: first, the establishment of the Task Force on the Cost of Health Services in Canada. The Conference of Ministers of Health of Canada established a Committee on the Cost of Health Services in November 1968. In February 1969 this Committee appointed seven Task Forces to examine specific areas. The reports of these seven Task Forces were transmitted to the Minister of National Health and Welfare in November 1969. This feat was a veritable tour de force and indicates what can be achieved. The actions arising from the recommendations of these Task Forces are being carefully followed by the Department of National Health and Welfare. Examples of the second type of co-ordinating function that the federal Department of National Health and Welfare has formed were the Conference on the Assistance to the Physician in mid-1971, the Conference on Manpower in 1969 and the Conference on Education of Health Manpower in 1971.

**Support of Research**

The principal agency engaged in *intramural medical research* is the Department of National Health and Welfare which in 1969-70 spent $8 800 000 on research and development studies and related scientific activities in the fields of radiation protection, air pollution, occupational health, environmental health, biochemistry, epidemiology and health services (see Table IX).

Under the *Public Health Research Grant* for applied and developmental research projects conducted by universities, hospitals, health departments and other non-profit health organizations, funds are also disbursed. (See Chapter IX.) It is estimated that $13 000 000 or 40 per cent of the *Health Resources Fund* expenditures in 1969-70 was used to build research facilities as an integral part of the program to expand the training of health personnel at medical and dental schools and affiliated centres.

The most important activity in the research area that has been developed by the Department of National Health and Welfare, in so far as our own interests in this study are concerned, has to do with the *New National Health Grant*. With the phasing out of the general health grant there was introduced a new type of National Grant to provide direct financial support for projects of national interest which are designed to stimulate and develop improvement in health services. An amount of $2 300 000 was provided in 1970-71 and increased to $3 264 000 in 1971-72. The new National Health Grant Program, like other Health Grant Programs, is operated by the Department of National Health and Welfare and is administered by the Health Grants Directorate of the Health Insurance and Resources Branch. Support from this Grant is directed to five major categories:

1) Health Care research projects – a systematic inquiry into the needs for, process of, and effectiveness of personnel and community health services;

2) Demonstration models;

3) Special service for educational programs;

4) Health Care Research Training Grants; and

5) Personnel support.

*The Medical Research Council*, a departmental Crown Corporation reporting to Parliament through the Minister of National Health and Welfare but completely separate from that Department, expended $35 642 000 in 1971–72 in its programs of personnel support and research development.

In spite of all the above it appears that the federal role is never quite clear. Almost without exception the Provincial Government representatives that we met with expressed the feeling that they were not sure what the Federal Government was supposed to do. Likewise, the Federal Government representatives appear to be cautious for fear of usurping the provincial prerogatives.

Quite apart from the fact that health itself is a difficult enough field to dissect, there are in this area two other major factors compounding the negotiating difficulties, namely, finance and education both of which loom large in practically every discussion of policy. It would be naïve to suggest that a way will be found to get over most of these difficulties. There could be, however, considerable clarification of the respective responsibilities of the Federal and Provincial Governments. This, it is hoped, will emerge in due course.

**National Standards**

In considering federal-provincial relations in matters of health, two subjects are of particular concern to us as we survey the scene:

*The need for uniform national minimum standards for each profession and technology.*

In this connection we quote as follows:

"One justification is to provide for each graduate, national portability of his professional credentials. A further reason for co-ordination is that changes in accreditation and licensing of individual professions may have

grave consequences for the rights and practices of other health professions. It is essential therefore that regulation of professions is done in a co-ordinated manner, considering the interests of all professions but placing above these, the interests of the public to be served. To achieve national minimum standards and portability of credentials without freezing educational innovation in relation to changing needs, and without producing stifling conformity, will present a major challenge in the co-ordination of educational programs with the activities of licensing bodies, registration boards and professional colleges."[2]

*The need for continuing federal involvement in research funding.*
The Federal Government has always assumed the major responsibility in the funding of research in Canada. Recently there have been clear-cut indications from some of the provinces that they would like to have more control in this connection. Behind this desire there are, undoubtedly, fiscal considerations together with a belief that the funds would be spent on research (and in a way) that would be more useful to the province, than it now is. Another argument is put forward to the effect that provinces are now put to the expense of sustaining ventures that were started with funds granted in a process over which the province had no control. This argument has been met in the case of the National Health Grants by passing on applications for research support to the appropriate provinces so that they may express an opinion on the desirability or undesirability from their point of view before the application is considered by the Grants Committee.

But the serious question is whether the provincial governments, if given the research money to dispense, would make a good job of it. There are, in our view, overwhelming reasons why the bulk of the money for research in the health sciences should continue to be dispensed from federal sources.

In the first place, overall planning for research of broad application can be much better done from a federal viewpoint than otherwise. In this connection the Medical Research Council, for example, has developed sound policies over the years of apportioning its funds to grants in aid, personnel support, and research promotion; problems of special national concern have been selected for attention. Every field has been given close attention and it is possible at the national level to collect a group of sound advisers in each of them. It would not be possible to do this in every province – or in *any* province for that matter. The amount of duplication of effort and hence the waste of money and time that would result if the research support were split ten ways would be enormous.

The second main consideration has to do with the importance of national competition as a factor in maintaining high standards of research. If an individual has to compete for support with all the others in his field across the country he will put forward his very best effort. If the competition is confined to others (if there are any) in his own province he may not have to exert himself as much. Competition in the research field, as in so many others, is an important element in the production of good work.

## *The Provincial Governments' Role*

"Provincial governments are primarily responsible for health measures to prevent disease and improve the health standards of the community. These comprise preventive health services, hospital services, mental health services, treatment services for tuberculosis and other diseases, and special treatment services and care of the chronically ill and disabled. They are usually administered by the provincial health department or other official agency in co-operation with the hospitals and voluntary health organizations, the health professions and the teaching and research institutions.

Although the pattern of services is similar, provincial health organization, financing and administration vary to some degree. Most health functions are exercised by the provincial health departments but in some provinces certain programs, such as hospital insurance, medical care insurance, tuberculosis control, cancer control or alcoholism programs, are administered by separate public agencies directly accountable to the minister of health. Voluntary organizations also provide specialized health services, often with some support from tax funds in the form of payment for services or support grants."[3]

**Increased Role of the Provinces**

The above statement taken from the Canada Year Book 1970-71, while factual, gives no hint as to the extent that the provincial involvement in health care has burgeoned during the past fifteen years. From small unobtrusive government departments whose functions did not, for the most part, involve the individual patient, doctor or hospital, the Provincial Agencies for Health have steadily enlarged the scope of their activity and influence to a point where they now rank with the most important departments.

With the introduction of Hospital Insurance the health agencies began to assume a new administrative role, at first simply distributing money to the hospitals and then, inevitably, becoming deeply involved in deciding how hospitals should spend it. The process has been long drawn out and painful in some respects – particularly for the business officers of hospitals, so much of whose energy has been spent in haggling over the details of budgets past and present; over the questions of allowable costs; and despairing over the rigidities imposed by the relatively inexperienced government officials. But these business difficulties have been the only things to mar what has otherwise been an excellent program. New hospitals have been built, older hospitals refurbished and all have been well equipped; modern advances in treatment have been rapidly adopted. Above all, while the administrators argued, the care of patients continued uninterrupted.

Another and greater spurt in growth of the health departments occurred when Medical Insurance came into effect. Again the distribution of huge sums has led to the necessity of finding out whether or not the money was being well spent. More staff was required for this, and then still more for the research and planning functions so necessary to the operation of what has now become, in each province, an enormous, complex, highly sensitive system. Here too the problems have been mainly administrative: mechanical difficulties of form filling and processing; delays in payments;

alleged overpayments and underpayments; difficulties in setting appropriate schedules of fees, etc. Again, in spite of all these, the care of patients has continued with little interruption.

So far the changes that have taken place have been largely in the ways that hospitals are financed and doctors are paid. Apart from some local exceptions we have not seen any marked changes in the system, in the interaction between patients and doctors and hospitals, or between institutions. But changes are clearly on the way. In the two largest provinces actions (many of which we have described in various parts of this study) have already been taken on the recommendations of committees set up by the provincial governments[4] which call for far-reaching reform. Indeed, no province is inactive. Steadily the provincial role in the health field is extending toward every corner. This is a movement that is inevitable and potentially beneficial.

**Dangers of Too Much Autonomy**

There are dangers. First, that a government may make some important move before it is properly prepared; before it has planned fully or assembled the people competent to execute the plan. This, in fact, was what happened in the cases of Hospital Insurance and Medicare. But here the resulting problems, while very considerable, were largely financial. *Equivalent mismanagement in a plan involving the actual delivery of care could have more serious effects;* not likely, we believe, in loss of life or prolonging of illness, but in gross inconvenience and, more important still, the setting back of the whole process of improvement in health care.

The second danger that we see is that as provinces develop their own schemes they may lose sight of each other, fail to profit from each others experiences and develop standards that are incompatible – a point that we touched upon in discussing co-ordination.

Clearly there is a need for a strong federal presence to maintain a degree of balance in the country as well as to carry out those functions that no one province can undertake, or that are better carried out federally than by each province separately.

## *Difficulties in Federal Leadership*

The constitutional position makes it hard for the Federal Government to lead in these matters; it can only influence the provinces by indirect means, usually fiscal, which while powerful enough to effect great changes, as experience has shown, are fraught with difficulties.

## *The Canada Health Council*

It is hoped that the Canada Health Council, the formation of which was announced by the Minister of National Health and Welfare in October 1971[5], will be able to play an important part in providing the type of overview, cooperative effort and critical appraisal that is now lacking. Clearly it could not lead, in the true sense, for it would have no direct power: but if it were made up largely of some people who were expert in various aspects of

health work, experienced in the practical application of ideas, and independent of government or of any professional association, and others who have no special knowledge of health affairs and would bring to the Council a judgment biassed only by the fact that they were "consumers", the Canada Health Council might be able to do a number of things that cannot be done by the present structures, manned as they are by people who inevitably are shackled to some extent by the traditions, the loyalties and the awkwardness of government departments.

## The Organization of Facilities

### *The Hospital as the Focal Point*

Traditionally independent, the hospitals, since the introduction of Hospital Insurance, have come increasingly under the guidance and even control of the respective Provincial Agencies of Health. This trend, an inevitable result of the governments' financial responsibilities, varies in its details from province to province but everywhere it is definite and progressing. A point has now been reached where virtually no hospital can make a move that has important budgetary implications, without the approval of the government. So far, in the main, dealings have been between the individual hospital and the government and each hospital has continued to function more or less in its ordinary fashion. As costs mount, the attention of governments is focussed increasingly on the lack of a system. Mentioned earlier in connection with the lack of co-ordination of facilities, this part of the system can be examined from three angles.

*1. Distribution of Hospitals*

In general, it can be said, the distribution of hospital beds in relation to population density is satisfactory, as might be expected considering the part that local municipalities have played in financing hospital construction. The main fault to be found is in the number of small hospitals scattered throughout the country.[6] Without a detailed knowledge of the services that each provides and of the other facilities that exist in the region, one cannot say with any degree of assurance how many of these hospitals might, in the interest of efficiency, be closed down. Nor, as has previously been pointed out is it easy to close a hospital in a small community because, as a rule, it is one of the largest employers in the neighbourhood besides being a comfort and source of pride to the people. In some cases the solution may be not in closing them but in transferring the activities of certain small hospitals to larger, more efficient, better staffed units and converting them to other purposes (for example, convalescence, rehabilitation) to fit in with a planned system of facilities. To achieve this is the difficult goal of every province.

*2. The Interhospital View*

The interhospital view concerns the functional relationships between hospitals, particularly those grouped together in urban areas. Until recent years there were very few dealings between hospitals; each went its own way and competition was the order of the day. Stimulated at once by the spectres of increasing cost and government control, the hospitals across the country

are looking about for ways and means of co-operating with their erstwhile competitors in the interest of increased efficiency and better service.

A number of formal groups have been established[7] for the purpose of hospital planning which, in most cases, involves a detailed study of the workings of the hospitals in the region concerned. Besides these there are many instances of pooling of some functions of hospitals, the best examples being the many collaborative trials in the computer field.[8] In the clinical areas likewise there have been some agreements reached about the disposition of patients, the sharing of staff and the provision of consultative services. But for all the activity it cannot be said that progress is rapid.

The obvious inhibitors are at play: there are two of particular importance in this connection. Institutional pride, understandably, is as great a factor in slowing down mergers as anything else. It stems from two sources: from the very history of the hospitals themselves which were developed by the initiative of religious orders and groups of citizens (the activists of their day) and have survived and progressed for the greater part of their existence with little government support; and from a strong suspicion that government intervention in the running of hospitals will lead both to loss of identity of the institution and to the confusion and inefficiency in its operation that is associated in the minds of so many people with government-operated ventures.

This institutional pride is not to be disparaged. It is something to be honoured and preserved in every way possible for it is the major bulwark against the wave of mediocrity which might submerge the whole system. It is threatened in many ways clinically and administratively, not the least being the moves that have been made to "democratize" the hospitals' Boards of Governors. It is doubtful that any system of Ministerial appointment or group representation will produce the competent, dedicated people who have heretofore worked on Hospital Boards. The great hope is that out of the mergers that are bound to come, institutional loyalty may be preserved.

The second main inhibitor to interhospital cooperation is the difficulty in determining the ways in which cooperation, sharing or specialization can be profitable. In the administrative field, the difficulties are not so formidable: here considerable progress has been made in, for example, the cooperative use of computer facilities, combined purchasing services, laundry services, etc.

On the clinical side where costing is necessarily imprecise and benefits extremely hard to measure, it is not easy to know what to do, or where to start. To the theorist the problem may not, at first glance, appear complicated. A neat plan, it seems, could readily be devised in which, given an adequate supply of beds and facilities in the various hospitals to handle the "run of the mill cases", the "special specialties" could either be divided up amongst the hospitals on some sort of equitable basis or concentrated in one or more spots. Such a plan, indeed, should be aimed at in each area but it is unlikely that the process will be easy or that a neat result will ever be achieved. Working with certain principles in mind[9] it should, however, be possible to devise for each region a sensible scheme without destroying the strong features of our present hospitals. This can only be done if the

hospitals are completely in favour, which they, in turn, will be only if they are satisfied that the planning has been well done. Where it has been methodical, open and careful, considerable success has been achieved in difficult situations.[10] Anything less is bound to lead to hostility with its resultant ill effects and delays.

The process of "rationalization of hospital services" is difficult and, in the best of situations, will take a long time. But it must be pursued energetically. It is clearly in everyone's interest that it go ahead for it is the first step in the development of an overall system.

*3. The Interfacility View*

The Utopian view of a health care system, described at the beginning of this chapter, is strangely like our own system. Indeed, we can say that, in this respect, we have practically achieved Utopia with our hospitals "so wel appointed, and with al thinges necessary to health so furnished, and more over so diligent attendaunce through the continual presence of cunning phisitians is geven ... that there is no sicke persone in al the citie, that had not rather lye there, then at home in his owne house". And herein lies one of our great problems, for our economy is far from utopian and we are charging ourselves too much to maintain these ample establishments and to provide the "diligent attendaunce" of "cunning phisitians" – or, for that matter, administrators, nurses, orderlies, technicians, etc.

**The Overloading of Hospitals**

So expensive has the hospital become that everyone realizes the importance of restricting its use to those who require the facilities that only it can offer. It is well understood that no patient should be admitted to hospital for diagnostic purposes alone; no one should attend an emergency department unless his condition is urgent; no one should remain in hospital to convalesce. And yet it is quite evident that a large number[11] of hospital beds hold patients who do not need active hospital care.

There are many reasons for this apparent extravagance, all of them simple. Where patients pose a difficult diagnostic problem it is so much easier (and, under the present system, better) to admit them to hospital where the consultants and the technicians can converge on the patients rather than having them seek out each of them separately outside. When they feel that they need to see a doctor and can't get hold of one they naturally go to the emergency department of the nearest hospital which, in all likelihood, is not properly staffed or equipped to deal with them efficiently. Sometimes it is because the patients want to stay an extra day or two in hospital to regain strength and confidence before returning to the chores of daily life at home; sometimes there is no one at home to take care of them; sometimes they are kept in hospital because of a test that has to be done and cannot be done once they leave; or because the program of rehabilitation will be interrupted. As often as not there is simply no place to which the patients can be sent; there is no house that can receive them, no nursing home or convalescent centre. They just wait in hospital until a bed turns up somewhere. Furthermore, where the patients have to pay for their keep in a nursing or convalescent home they are disinclined to leave the hospital.

Nor has the latter any financial incentive to have patients leave early, for the per diem allowance is the same no matter what is done for the patient; thus the convalescent days are the cheapest for the hospital.

## *The Need for Other Facilities*

If the loading of the hospital with patients who could be taken care of as well somewhere else is but one facet of our organizational problem, examination of ways to overcome it opens the doors for the discussion of most of the others. For example:

– diagnostic facilities. To obviate the necessity of admitting patients to hospital for diagnostic purposes, provision should be made for ambulatory facilities of equal quality. This thought leads to the consideration of the potential in this respect of the doctor's office, the private laboratory, a clinic, or the out-patient department of the hospital. In like manner, there is a potential in these for

– ambulatory care facilities to service patients who need not be kept in hospital for some simple observation to be made, a lab test to be repeated, a drug administered, or rehabilitation continued.

– The provision of continuing care facilities introduces, besides the question of how the facilities are to be developed and operated, the more general question of interservice communication – in particular the patients' records.

### Diagnostic Facilities

In the vast majority of cases the diagnostic process starts in the doctor's office. Some of these offices are equipped to perform a wide range of tests but those patients requiring tests that cannot be carried out in the office are referred to a laboratory, either private, hospital or, occasionally, government. Likewise, if a consultation is required the patients usually have to go to another office on another day. If the doctors steer their patients well and if the local facilities are adequate, the procedures can be carried out with dispatch and without undue inconvenience to the patients; but it is highly unlikely that this always obtains. We are not aware of any substantial evidence on this point but it seems more than likely that the difficulty involved in co-ordinating the activities of the patients, the doctors and the consultant's offices, and the laboratories cannot be overcome in many circumstances, particularly when large numbers of patients are involved. Where co-ordination is lacking, the resultant delay and the inconvenience to the patient can be important.

### Questions of Accuracy and Efficiency

Besides this, the question of diagnostic accuracy in the clinical and radiological laboratories should be considered. We have no precise information on the numbers of private, non-hospital, clinical laboratories in the various parts of the country, but scattered bits of evidence indicate that they are considerable. There were, for example, 67 clinical laboratories accredited in Alberta[12] and 112 in Ontario[13] in 1969.

That there was some reason for concern about the quality of the work

in these laboratories was pointed out by Tonks[14] some years ago and confirmed more recently by Bell[15] who states that in the Alberta Quality Control Survey it was found that while there was a high standard attained "in those laboratories with qualified medical specialist supervision, the quality of work elsewhere varied greatly, often being of low standard...."

The findings of the investigators appointed by the Committee on the Healing Arts in Ontario[16] to examine the private clinical laboratories were summarized in part as follows:

"1) The accuracy is significantly better than was found in Tonk's survey of Canadian laboratories in 1960.

2) The accuracy is slightly poorer than the New York State Class A (approved) laboratories but significantly better than the Class B (unapproved) laboratories.

3) The accuracy is generally comparable with or inferior to the average accuracy of Toronto hospitals, and definitely inferior to the accuracy of the larger well-equipped, well-staffed hospitals.

4) There is no cause for alarm at the level of accuracy at which Ontario laboratories are performing; and it is not true to suggest that the laboratories are providing an inferior service, with a high percentage of erroneous results which lead to patient suffering. The laboratories are providing a responsible, medically useful service, comparable to that provided elsewhere.

5) Bearing in mind that the level of accuracy as measured in this survey is probably the best that the laboratories can do and that at times the level of accuracy may be much lower, it is apparent that there is room for and a need for improvement. Action should be taken to effect such an improvement."

Clearly there is a problem here that should be tackled. It has been taken in hand in several provinces (programs for accreditation have been introduced or are being developed in at least four provinces – B.C., Alberta, Manitoba and Ontario).[17] While there is a tendency to concentrate attention upon private laboratories, it is evident from the investigations that have been done that there is an equal need to monitor the quality of the work carried out in hospital laboratories.

**Central Laboratories**

In view of the potential (and doubtless, frequently, actual) inconvenience to patients, the difficulties in controlling quality of work and the probable higher cost involved in the operation of these multiple small units, it might well be asked if the work couldn't be better done in large regional or district laboratories. This may well be the case: theoretically it appears definitely to be so. But the situation is not nearly clear enough to permit a rapid answer.

There can be no reason for the public to support laboratories whose work does not meet the same standard of efficiency and cost that apply to hospital government laboratories; but there is no evidence to suggest that these standards could not be readily achieved in a well-organized private laboratory. It is, furthermore, conceivable that multiple smaller laboratories can, in certain circumstances, provide better service than the larger central unit. The situation is one that calls for a careful study of accuracy,

case loads, available facilities and cost factors, etc., in each region: it may be expected that there will be found considerable variation from district to district.

A sub-committee of the Ontario Council of Health[18] considered the "advisability, feasibility and pattern for development of a regional system for providing laboratory services..." and stated in its report, "there is need to develop integrated regional laboratory programs which could, but not necessarily would, involve centralization. Any decision regarding centralization should be determined by the specific needs and considerations within each region. For certain procedures in some regions, integrated decentralization may best serve the purpose of services, education, local involvement, and research and development".[19]

Some action has been taken. A system of co-ordination of laboratory facilities is fairly well developed in the Hamilton area, for instance. A Task Force has been established to develop means of implementing co-ordination generally in the province, but in the main progress here, as elsewhere in the country, has been slow.

**Ambulatory Care**

At present ambulatory care is provided by doctors working singly or in groups[20] in private practice, by full-time physicians in hospitals, offices and out-patient departments, in general and special clinics, in industrial plant clinics, workmen's compensation clinics, government clinics, rehabilitation centres, community clinics of various sorts, etc. The picture is patternless and confusing and while, in many respects, the service provided is good there are, as has been mentioned previously, certain faults which if they have not been well documented are plain enough.

The recommendations of the various commissions, directed toward the correction of these faults, have been concerned mainly with the encouragement of doctors to work in groups and the establishment of "community clinics".

**Group Practice**

There has been over the years, a definite trend in the direction of group practice which should rapidly become more prominent as the advantages such as efficiency and the ability to provide continuing and more complete service to the patients and continuing education to the doctor become more evident. Group clinic practice, notably in the West, is well established and should thrive to a point where it may solve some of the above mentioned problems.[21] But many problems will remain of which two are of the greatest importance:

– those having to do with distribution, for the siting of these group clinics is dictated by economic factors not necessarily related to the need for service; and

– those respecting the provision of comprehensive care.

So long as the only source of income is payment for specific medical services rendered to patients, a clinic will not be able to offer in sufficient quantity the auxiliary services (social, welfare, preventive, etc.) so necessary for the provision of comprehensive care in many, particularly urban, districts.

This deficiency could be corrected by some means of special adjustment of fees, by grants to cover the cost of employing special workers, or by the secondment by government of personnel to work in these clinics when the situation warrants it. So far as we have determined nothing of this sort has been tried.

**Community Clinics**

The "community clinic" is an alternative. The term is not always clearly defined. It can be taken to mean any one of a number of types of organizations providing primary care which various combinations of citizens' and doctors' groups, unions, universities, students and churches have formed, are operating under several kinds of "Boards"[22] and are financing in different (and in several cases makeshift) ways. We have described eighteen organizations (Appendix 2, of the Supplementary Papers, Research List Section C) that *might* be classified as "community clinics" and have summarized some of the pertinent information concerning them. Four of these have been operating for many years (Mt. Carmel, Saskatoon, Prince Albert, Sault Ste. Marie); the others for only a short time. Only ten of these conform to our concept of a community clinic. (Research List Nos. 282-291 in Appendix 2.)

The scope of services offered, the staffing, the facilities, and the type of community served vary widely. In some of them evaluation studies of one type or another are being carried out (Morley, Churchill, St. Catharines, Blackhead Road, Sault Ste. Marie, Primrose, Smithsville), but to date we have encountered little information on the question of the effectiveness of these clinics. They represent a modest but significant start or basis for what is conceived to be an important program to bring better order into the field of ambulatory care. Doubtless some valuable information can be gained from the experience that is building up. But to establish community clinics on a firm footing and on a large scale as is envisioned in some of the commission reports and has been suggested by some governments (for example, Manitoba and Quebec) will require the most careful study and planning.

If it were a question of starting from scratch, the course of action would apparently be simple enough. Few would doubt in theory the superiority over our present system of a series of well-distributed clinics offering a full range of services, available to all at all times and linked with the other health care services. Fewer still would suggest that the way out of the present difficulties would be to multiply our present methods, to put out more doctors to practice in the traditional fashion. But to scrap what exists in order to build anew or to to embark on an extensive program of additional facilities would be shortsighted in the extreme for a number of reasons; the main ones being that no one knows what is needed, nor what can be managed. It is not known that "community clinics" are the panacea for the delays, the confusion, the lack of attention, the high cost, etc., that are complained about. They may be. But it would be well to find out before plunging too far. It is surely obvious that there is no single approach, that what is required to bring about significant improvement in care may be very different in different localities. If, as is presumably the case, the eventual objective is a basically uniform system within each province, the approach

to it should be measured and, until sufficient experience has been gained, gradual.

Each region in each province doubtless has its own characteristics: be it remote, rural, suburban, or urban the chances are that there is something unique about its geography and its mix of people, health personnel and facilities. An essential task, it would seem, would be to make an inventory of each region to serve as a baseline for deciding what needed to be done or tried. This has, so far, only been done in a patchy and incomplete way.[23] Until it is completed rational *overall* detailed planning cannot be commenced. This is not to say that major *local* experimentation should be held back until all the needs are known. Indeed one of the great dangers to be faced in developing increasing numbers of scientists with an interest in health care delivery is overcaution. It does not take any intensive research to discover areas of real need, nor is it particularly difficult to work out the details of major experiments that might be carried out in some of these areas. Where the real research challenge lies, in this respect, is in devising, conducting and correlating the studies that are required if the degree of success of the enterprise is to be known.

We have come across and have listed (refer to Appendix 2 of the Supplementary Papers, Research List, 266, 267, 286, 288, 390, 401, 406) some examples of "before and during" or at least "during" studies. Useful though they are in their own right, they serve to illustrate the enormity of the general problem of system evaluation: for involved in these studies is a fair proportion of the health care research talent in this country. The fruits of the labour can only whet the appetite of those aware of the questions that need to be answered.

However, a major trial without a built-in evaluation program is hardly worth undertaking. The question, ridiculous as it may seem, is what to evaluate? Is it possible to make a model of the systems involved in the trial, and manipulate it to find the answers? G.K. Matthew in discussing measuring needs and evaluating services says, "computer 'models' of a whole service, complex enough to allow a meaningful evaluation, are something which operational research scientists wish to develop, but it is far too early to know whether such models are feasible or to look to them for help in evaluating new services".[24] This, an English opinion, applies equally well in Canada. Serious work has begun in this area (see page 114): its potential is unknown, but in all probability is very great, yet the techniques are not yet sufficiently developed to be relied upon. For the present, cruder methods must suffice. Even these have not been fully worked out.

If asked how to compare the work of one hospital or clinic with another, one is hard put to go beyond the ordinary standard comparisons (cost per bed per day or visit, cost per patient day, etc.) and yet there is need to go farther if a real comparison is to be made. No one knows how best to do it and one of the important tasks facing the experts – and they are grappling with it – is to devise relatively simple, manageable and reliable indices that can be used for comparative purposes. The answers will only come gradually as experience is gained in modifying the primitive methods now available. Indeed one is much more likely to discover how to do it if actively engaged in practical problems, than by waiting until the theory is straightened away.

**Continuing Care**

As shown in Table I there are a large number of facilities in the country classed as homes for special care and variously entitled Nursing Homes, Convalescent Homes and Homes for the Aged. The Acts under which these institutions are licensed are administered by a variety of departments and divisions of governments. Sources of revenue (for patients, Municipalities, the Provincial and Federal Governments) differ between types of institutions and in different provinces.

**Table I – Continuing Care Facilities* by Province and Department Administering for 1971**

| | Number of Homes (Feb. 1971) | Department Responsible for Administering Act |
|---|---|---|
| B.C. | 491 | Dept. Health and Hospital Insurance |
| Alta. | 145 | Dept. Health (Nursing Homes)<br>Dept. Social Development (others) |
| Sask. | 87 | Dept. Welfare |
| Man. | 89 | Dept. Health |
| Ont. | 865 | Dept. Health (Nursing Homes)<br>Dept. Social and Family Services (others) |
| Que. | 408 | Dept. Social Welfare |
| N.B. | 92 | Dept. Health |
| N.S. | 98 | Dept. Public Health (Nursing Homes)<br>Dept. Public Welfare (others) |
| P.E.I. | 10 | Hospital Services Commission and Dept. Welfare |
| Nfld. | 50 | Dept. Social Services and Rehabilitation |
| **Total** | **2 335** | |

*Types of Facilities are classed as Homes for Special Care, including Nursing Homes, Convalescent Homes, Homes for the Aged.

*Source:* Dr. M. Kozakiewiez, Senior Consultant, Rehabilitation Services and Dr. M.B. McKenzie, Consultant on Welfare Institutions, Department of National Health and Welfare.

Similarly, quality control measures are far from uniform and the degree of liaison between continuing care facilities and hospitals fluctuates widely. There is, in fact, no pattern. However as part of the general reorganization, there is considerable activity in several of the provinces (studies, pending legislation, etc.) directed toward regularizing the continuing care situation. In Alberta, organization of this phase of health care is farther advanced than elsewhere. Already a system of contract nursing homes (approximately 55) and auxiliary hospitals (27) many of which are located on the grounds of active treatment hospitals, is established and, from all accounts, working well.

*Research and Trials in Continuing Care*

We have encountered a few methods of delivering continuing care and we suspect that there are a great many more. A number of hospitals have reported *Home care trials* (see Appendix 2 of the Supplementary Papers, Research List Nos. 359 – 370). The Victorian Order of Nurses involved in several of these trials reports that it is conducting twenty home care programs and that an effort is made to evaluate each of them.

In an interesting and imaginative scheme, now well established at Deer Lodge Hospital in Winnipeg, disabled veterans are cared for in a balanced

home-hospital regime, spending no more time in hospital than is necessary to be "refitted" and give some rest to the people at home.

*Convalescent and Nursing Home Care*

As might well be imagined there is often great difficulty in matching the various types of patients and institutions. We have learned of two places where this problem has been met. In Ottawa, the Nursing Homes and Special Care Branch of the Carleton Social Welfare Department has, since 1957, operated an Assessment and Placement Service, the function of which is to identify the needs and capabilities of patients and find appropriate accommodation for them. More than half the nursing home beds in Ottawa are occupied by patients assisted by this Service. In Hamilton, Ontario, the Assessment and Placement Service (Extended Care) of the Hamilton District Health Council started a similiar service, in October 1971.

The importance of these services (which, so far as we can determine, are the only ones of their kind in Canada) goes beyond the very considerable satisfaction that they provide both the patients and the nursing homes. The information that can de derived in the process of assessing patients and institutions can be of the greatest value in planning for the future.

In Belleville, Ontario[25] a research pilot project on Graduated Health Care is now underway. The central features are:

- –A 350 bed acute care general hospital;
- –A convalescent wing of the hospital (in March 1972, 54 beds, by September 1972, 104 beds);
- –An 80 bed Motel Unit, three-quarters of a mile from the hospital, termed a "self care unit" where minimal nursing services are provided;
- –Home Care service.

A key person in the system is the Discharge Planning and Referral Officer who identifies the patients in the hospital who are ready for transfer to one of the other services and who is in a position to effect the transfer. This system, after a few months of operation shows promise of being very successful and has attracted a lot of interest.

There are, thus, several pockets of important activity in the continuing care field. Much more needs to be done. In connection with the question of co-ordination between the health care institutions, special note should be taken of the importance of including the continuing care facilities in the orbit of Hospital Planning groups, for the efficient usage of hospital beds depends upon a good outlet.

*Rehabilitation Medicine*

Developed, to all intents and purposes, during the Second World War, the specialty of rehabilitation medicine has progressed slowly but with some considerable effect. G. Gingras has reported that there was in Canada in 1970 a total of 95 practising specialists in the field, about one-tenth of the overall number of trained physiatrists needed in the country. There are a number of first-rate rehabilitation centres, some independent and organized for specific purpose, some operated by Workmen's Compensation Board, many attached to hospitals. But it cannot be said that there is anything more that can be achieved by the efforts of a dedicated individual – or of a

government on behalf of a specific group of people. "Few provinces have set in motion a well-oiled co-ordinated program for the rehabilitation of their disabled citizens. It is unfortunate that friction between the Departments of Health, Labour and Education, generally unknown and unpublicized, has created more unco-ordination and misunderstanding than co-ordination."[26]

An Ontario Council of Health report points out:

"The breadth of scope of the rehabilitation process has impeded the development of a comprehensive and integrated system for the delivery of rehabilitation services. In the past, no system has existed to provide a framework in the context of which needs could be considered. A multiplicity of public and voluntary organizations and agencies have developed services to meet specific needs, without sufficient study of the effect each development might have on the overall pattern. This has resulted in unnecessary duplication in some areas, gaps in others, and organizational fragmentation which has led to a lack of continuity in patient care, inefficient use of manpower and physical resources, and rising costs.

Some of these problems could be solved by adopting the 'Programme Concept'...."[27]

The picture is a familiar one, typical, in some respects, of most other elements of the Health Care System. But the importance of Rehabilitation Medicine has not yet been fully realized, the centres are still struggling for recognition. It can only be urged here that in the regional planning that must come about, the place of rehabilitation will receive full attention.

## *Regionalization*

The concept of regionalization of health services is clearly in the minds of every planner who sets out to devise a system of health care.[28] Nor is it new. When the Federal Health Grants-in-aid program was instituted in 1948 each province was required to develop a master plan of a balanced network of hospital facilities and services. E.V. Wahn states that all of the plans developed were based on a regional concept. He goes on to describe how the attemps to effect the plans using fiscal sanctions as the main weapon broke down because the planners "... failed to appreciate the simple, crucial fact that no matter how well designed and logical a plan is, it will not work and cannot be successfully implemented unless and until it gains general acceptance by those people whose obligation it becomes to implement it."[29] Furthermore, any plan that did not conform to a community's wants (as distinct from the needs) was readily scuppered by a citizenry aroused as much by the fact that its representatives were not consulted, as by its disapproval of the plan itself.

### Consumer Involvement

To correct this fundamental error, all recent plans have provided for extensive involvement of "consumers" at the district and regional levels. But the problem is far from solved. People are naturally cautious of the

regimentation and the forced changes that they associate with "regionalization". This is not to say that regions within a province cannot be developed; they obviously can, for most of the provinces are regionalized for a number of purposes. There are educational, social service, public health, mental health, electoral and other regions – few, it should be observed, coinciding with any other. The barriers to regionalization of a single, relatively independent service are not great. But where attempts have been made to regionalize complex systems, involving various institutions and services, difficulties have arisen. The theoretically sound proposal to reorganize all the public services in Saskatchewan on a common regional basis is a case in point. A Bill was passed in 1962, but the communities have not been enthusiastic enough to take advantage of it. Another example of the unpopularity of regionalization is Ontario's Regional Economic Development scheme which, introduced in 1966, is still encountering heavy weather.

Against this sort of background it is clear that any new plans for regionalization of health services have to be most carefully prepared and judiciously introduced. It is also evident that any attempt to effect a rigid system with people "locked in" to their regions is bound to fail. What, then, is possible, and what advantages can accrue?

**Why Regionalize?**

The question might well be asked. It may never arise in some of the provinces, particularly those with a relatively small population who can manage the situation in every part perfectly well from the centre. But in others, with a larger population that is widely and irregularly distributed, the question is being seriously considered: the pros and cons of setting up a regional system are being debated.

Those who argue against regionalization point to the confusion and increased cost that have, or are said to have, resulted in other situations where regionalization has been introduced (regional government, education, economic development) and observe that it seems unwise to decentralize at a time when improvement in communication, information handling and storage are making efficient centralized planning and control increasingly feasible. They are impressed, too, by the shortage of competent administrative personnel and the dangers of dispersal.

The proponents hold that local involvement is essential for the planning itself and for the execution of plans. They maintain that without the information that only the people of the region can supply fully planning is difficult, and that unless these people have been involved in the process they will not support the execution of the plans with the energy necessary to bring about an effective system. They point out that no central office can ever properly appreciate and deal with the specific problems of the region.

While there has been much debate and some actual trials, it cannot be said that the argument is settled – or even nearly settled. We see at the moment, in the country, an amorphous mixture of centralization and regionalization, with both components in the early stages of development. The recent rapid growth of provincial health agencies with the control of Medical and Hospital Insurance and the development of provincial

Research and Planning facilities have been noted as strong centralizing forces. At the same time the largest Health Departments are committed to a policy of regionalization.

**Some Regional Plans**

1) In *Quebec* the process has advanced further than anywhere else in the country. The Eastern Townships' Health Services Planning Committee was created in September 1966. The region has many advantages. Boudreau[30] mentions its relatively small size, its relative homogeneity (no very large cities and no completely isolated sectors) and a regional consciousness, as important, but subsidiary to the presence of the University Medical Centre. To these advantages one should add the presence of a dedicated and competent group of experts devoting their whole efforts to the project, backed strongly by both university and government. Yet progress has been slow and functional regionalization has not been effected in any part.

"Four years is a long time to achieve what has been achieved in the Eastern Townships and certainly the development of our regional organization appears to be very slow. But, we do not think it would have been possible to go much faster in the context of voluntary participation and with the system of trial and error that we had to adopt", reported Boudreau in May of 1970.[31]

A year and a half later the project was still in the preparatory phase. This slowness is in no way to be interpreted as resulting from incompetence or lack of determination. It is a measure of the time that it takes to carry out the necessary studies, to bring together the people involved, to make the plans and, above all, to convince these people that they stand to gain.

2) In *Ontario* the concept of regionalization was endorsed by the Council of Health[32] and a Task Force was established to "examine and make recommendations on: How a system for the regional organization of health services might be implemented in the 'Hamilton Region' ...."

A report was issued by the Task Force in April 1971 outlining in detail the steps that should be taken. To date no effective action has been taken on the recommendations in the report.

3) More recently, in *Nova Scotia*, a study (unique in the respect that it was conducted jointly by representatives of the Federal and Provincial Governments and the Provincial Medical and Hospital Associations) was carried out and a report was issued in December 1971.[33] Here again a regional system has been recommended. Of particular interest in this report is the technique used by the study group to determine the regional boundaries: flow patterns of patients to their physicians and to hospitals were studied and the boundaries were drawn in an effort to satisfy the functional requirement that the vast majority of patients receive hospital care and attend their doctors in their own region.

**Hospital Planning as a Regional Activity**

There are, in Canada, a number of formal organizations that have taken as their objective the bringing together of hospitals in an area for the primary purposes of hospital planning and functional cooperation. Some of these are listed in Appendix 8 in the Supplementary Papers. None of these has

been functioning for long and none is fully effective yet but some lessons have been learned.

*Some Problems*

The first group of lessons is to be found in the Annual Reports of the Metropolitan Toronto Health Planning Council which, since its inception in December 1965, has found it difficult to develop its full potential. Reading through these Reports one sees first the cumbersomeness and yet the necessity of involving the "people affected" in the process from the beginning; the importance of a clear-cut mandate that all can understand and that will be honoured by the government which issues it; and the difficulty that can arise if the mandate is neither exclusive nor broad enough. Specifically (in its third Annual Report) the Council noted that its work was hampered by the facts that:

– the planning for the teaching hospitals in the region was assigned by the government to another body;

– "end runs" were permitted (hospitals bypassing the Council and making their case directly to the government); and

– its terms of reference did not give the Council any jurisdiction over the planning of continuing care facilities.

Even if these problems are local and are in the process of being overcome, other councils have encountered at least some of these same difficulties arising mainly from a lack of clear-cut authority – an unwillingness of government to make it plain what and how firm was the authority that it was delegating.

*Some Successes*

Other experiences have been more encouraging. Reports from several of these bodies show that breakthroughs can be made in some of the toughest areas. To mention a few:

The 1970 Annual Report of the Metropolitan Toronto Hospital Planning Council in referring to the results of a study in one of the districts, says:

"It confirmed beyond any doubt that the anticipatory approach to planning, as a process of group decision-making in which development of consensus is a central feature, is perfectly feasible and one which should be followed in Metropolitan Toronto in the future. There is just no way that consensus of the kind that was reached in respect to area-wide needs for active treatment beds and complex diagnostic and treatment services could have been achieved under the central regulatory approach .... There was a meeting of minds on a great many contentious and controversial issues. Inter alia, there was agreement that (i) the number of active treatment beds in the area could be reduced by more than 100 from the number originally approved by the Ontario Hospital Services Commission; (ii) only two of the four active treatment hospitals should establish comprehensive pediatric units; (iii) only one of the active treatment hospitals should develop comprehensive neuro-surgical facilities; (iv) only one of the active treatment hospitals should develop comprehensive psychiatric facilities; and (v) only one of the hospitals should establish an active rehabilitation unit. Moreover, there

was agreement that the development of a burn unit, a chronic renal dialysis unit, a pulmonary function laboratory and a clinical investigation unit at any of the hospitals should not be encouraged at this time.

As has been suggested, it is highly unlikely that the degree of consensus that was reached could have been achieved under the central regulatory approach. If any central planning agency had recommended a reduction in active treatment beds from the numbers previously approved by the Ontario Hospital Services Commission, there would have been a real hue and cry. Representatives of the various hospitals, at which the reductions had been proposed, would have resisted strongly the implementation of any such cuts. Past experience in Metropolitan Toronto would lead this Council to believe that their resistance endeavours would be successful."[34]

The Queen's University and Areas Hospital Council has achieved acceptance of the idea that its two major hospitals will function in many important respects as a single unit and to this end has arranged for assignment of special services to eliminate or minimize duplication. It has included extended care in its planning.

In Hamilton considerable progress has been made in co-ordinating the management of respiratory disease and special kidney programs, the laboratory services and programs of extended care.

In the Eastern Townships of Quebec good cooperation between hospitals in several of the districts has been developed.

**Regionalized Services**

Already in many provinces there are certain services organized on a regional basis; Public Health and, to some extent, Mental Health services being prime examples. Cancer treatment is the only other clinical service so organized. An important proposal has been made recently by a joint committee representing obstetricians and pediatricians.[35] Having reviewed the performance in Canada in caring for mothers and newborns and having noted particularly the regional disparities,[36] the report proposes a form of regional organization:

1) To make available suitable local care facilities, transportation, consultation facilities to advise local physicians as to an appropriate management; to help the physician make a decision regarding retention of the patient locally or the referral of that patient to a central specialized obstetric/pediatric care unit.

2) To train individuals for the various regional units.

3) To educate family physicians in the identification of the high risk pregnancy and its management.

4) To educate the public in the area of reproduction, especially in the proper use of available facilities.

5) To recognize specific problems related to race, culture, socio-economic status and educational background and to implement measures to overcome them, particularly for the native peoples.

6) To set up a satisfactory system of data retrieval and analysis to enable care to be upgraded and to be satisfactorily audited.

7) To evaluate total care received, particularly with respect to the

effectiveness of monitoring during labour and post-natally, and the long term follow up of actually or potentially damaged infants.

**A Progression Toward Regionalization**

As was observed above the arguments about regionalization of health services are not settled. But with the experience gained it can be asserted with some confidence that for the efficient development and operation of health services in the larger provinces some form of regionalization is necessary. It is evident, too, that any all-inclusive system in which people are "locked in" their regions is unlikely ever to be accepted in this country; indeed, any suggestion of over-rigidity will be stoutly opposed by a population accustomed to a large measure of freedom in health matters.

Thus regionalization must be approached in step-wise fashion and in the process many things can be learned about what will and what will not work; not the least important of things to be determined is the extent to which the "local authorities" can profitably contribute to decisions.

The first steps toward regionalization have already been taken. In several provinces lines (which are necessarily elastic) have been drawn. The *groupings of hospitals* being by far the greatest step, extreme importance is attached to their progress. If success can be achieved in the trials now underway, the rest should fall readily into place. We have noted some encouraging signs and there are doubtless many that we have missed, but even so there is no disguising the reluctance to cooperate that exists.

It is still possible, even likely, that deadlocks that cannot be broken by the existing voluntary machinery may occur. If progress depends upon a decision being made and the councils cannot make it, clearly the governments must do so. As councils develop more expertise and understanding and as the data upon which decisions are based become more precise and significant, government intervention should rarely be necessary; and as government departments themselves become more versed in problems of this sort their actions will be the less resented. This halcyon state will not likely mature for some time to come, meanwhile it is inevitable that tough situations will arise that can only be resolved by someone being forced, as he feels, unjustly, to give up something important.

While hospital co-ordination (which should include continuing care facilities) is being worked out, a number of activities not requiring extensive research or great community "input" might be started in each region. For example:

1) A reallocation of some of the present government functions; the establishment of regional offices to deal at the local level with Hospital and Medical Insurance matters and to act as the headquarters for regional planning activities;

2) The organization of public health, welfare, social, mental health and ambulance services on the same regional pattern;

3) Continuing education program;

4) The assessment of the quality of medical practice;

5) The development of regional clinical services. This holds particular promise: as noted above the obstetricians and pediatricians have set about to promote a regional program in the belief that only by this means can the

care of mothers and infants be brought up to a satisfactory level. The same case might be made for the injured and emergency cases generally. Possibly it will be determined that other categories of patients can best be handled in this way.

These moves could well be the first in the progression toward regionalization. Their establishment would tend to imprint the regional concept and facilitate the more difficult aspects – the co-ordination of hospitals, ambulatory care, records and laboratory facilities.

# VI. Cost and Management

## The Cost of Health Care

If the information on the quality of health services in Canada is incomplete and imprecise, knowledge about their cost is definite and disturbing. Canada is not alone in its concern about the steadily and rapidly increasing proportion of the national effort that is devoted to providing care for the sick. Many other countries, with widely different systems (notably Great Britain, France, Switzerland, U.S.S.R. and U.S.A.), have noted with some alarm their own similar situation and each is seeking ways of making its services more efficient and less costly. But the fact of being no worse off than others in this respect in no way detracts from the seriousness of the problem; nor is it possible to draw extensively from the experience of others, for while there are many gross features common to all, the details of Canada's system are sufficiently different to require specific solutions.

## The Magnitude of the Problem in Canada

This can be expressed in the following ways:

1) The proportion of the gross national product that goes to providing health services;

2) The proportion of personal income that the individual spends on health care;

3) The actual money spent on health care in Canada over the years.

**Proportion of Gross National Product Going to Provide Health Services:**
In the mid-1950s total expenditures on personal health care amounted to 3 per cent of the Gross National Product. By 1969 the proportion had risen to 5.5 per cent.[1]

**Proportion of Personal Income**
The proportion of personal income that the individual spent on total health care rose by a half from 4.28 per cent in 1957 to 6.35 per cent in 1969. Hospital services absorbed the bulk of this increase, for in 1957 the individual spent a sum equivalent to 2.4 per cent of his personal income on hospitals and nearly twice as much in 1969. The relevant increases for doctors, dentists and drug expenses were 1/3, 1/10, 1/20 respectively. The above figures refer to our national totals or averages. While there were considerable variations between the experiences of the different provinces and territories, the overall trends are the same and there is no reason to consider the provinces separately in this study.

**Actual Expenditures on Personal Health Care.**
Even taking into account the increase (during the period 1957–1969) in population and in the number of hospitals, doctors and health workers generally, the rise in expenditures on personal health care[2] has been very considerable. The total expenditures on personal health care increased from $1 047 403 000 in 1957 to $3 887 467 000 in 1969, almost quadrupling during this 12-year period. The individual elements making up this total cost did not all increase at the same rate. Almost 4 times as much was spent

on hospitals in 1969 as in 1957 ($2 475 911 000 from $587 370 000). Likewise doctors received approximately four times as much in 1969 as in 1957 ($910 000 000 compared to $217 795 000). In the case of payments to dentists and for prescription drugs the increase was less marked being less than 3 times in both cases (dentists $85 008 000 to $231 450 000 and drugs $103 230 000 to $270 106 000). The proportion of the total that each element comprises is shown in Table II.

**Table II – Proportion of Total Health Expenditures Going to Hospitals, Doctors, Dentists and Drugs in 1957 and in 1969**

| | 1957 % | 1969 % |
|---|---|---|
| Hospitals | 56.0 | 63.7 |
| Doctors | 26.0 | 23.4 |
| Dentists | 8.1 | 6.0 |
| Drugs | 9.8 | 6.9 |

*Source:* Calculated from *Expenditures on Personal Health Care in the Provinces of Canada, 1957–1969*, Research and Statistics Memo, National Health and Welfare, November 1970.

It should be noted that the figures in Table II refer to personal health costs. If certain other administrative costs and capital costs are included the position changes somewhat as shown in Table III.

**Table III – Proportion of Total Health Costs Going to Hospital and Other Services in 1968**

| Health Costs | Percentages |
|---|---|
| Hospitals | 49.3 |
| Health Services | 6.6 |
| Administrative Costs of Health Insurance | 4.4 |
| Dentists services | 4.7 |
| Physicians services | 17.6 |
| Public Health services | 5.1 |
| Prescription Drugs | 5.8 |
| Hospital Capital Costs | 6.5 |

*Source:* Canadian Medical Association, Department of Economics, *Canadian Medical Association Journal*, Vol. 103 (5), 12 September 1970, page 562.

This list is still not complete because it does not include all the costs of running the Government Departments concerned with Health Care, nor those parts of the cost of Education and Research that might be attributed to health.

## The Rising Cost

While it is difficult to know precisely what is spent on health there is sufficient firm information in the tables to indicate clearly:

1) That health costs comprise a substantial part of the national expenditure;

2) That costs are rising rapidly;

3) That by far the biggest element in health costs are those connected with the running of hospitals (3 times as much as any other element), and these are the most rapidly rising of all costs;

4) That expenditures for physicians services are the second biggest element in costs and are also rising rapidly.

## The Significance of the Problem

The figures are certainly impressive. Even allowing for the difficulties in accounting that stem from the changes in the financing of health care over the past twenty years (the switch from the private to the public sector in the payments for hospital and medical care), there can be no doubt that the costs are enormous and are mounting so rapidly that the serious concern that is felt by everyone involved is justified.

The key questions are – How much *should* be spent on health and do people get their money's worth?

In response to the first question it can only be said that there are no scientific grounds to support a decision on how much *should* be spent on health. The simple fact is that one cannot put a value on health or health care. A cost benefit analysis cannot be made when the benefit is not measurable. Any decision made in this connection is, of necessity, arbitrary. In considering the question of how much should be spent on health it is interesting to review the breakdown of how the average Canadian spends his money. (See Table IV.)

**Table IV – Patterns of Expenditure of Families and Unattached Individuals in Canada, 1969** (Percentage Distribution)

| | |
|---|---|
| 1. Shelter, household operation, furnishings | 23.9 |
| 2. Food | 18.7 |
| 3. Personal taxes | 13.5 |
| 4. Travel and transportation | 13.1 |
| 5. Clothing | 8.1 |
| 6. Security | 4.3 |
| 7. Recreation, reading | 4.0 |
| 8. Smoking and alcoholic beverages | 3.8 |
| 9. Medical and health care – includes Medicare and hospital payments | 3.4 |
| 10. Gifts and contributions | 2.7 |
| 11. Personal care | 2.1 |
| 12. Miscellaneous expenses | 1.6 |
| 13. Education | 0.9 |

*Source: Statistics Canada Daily Bulletin*, Information Canada, Ottawa, Friday, January 28, 1972, page 6.

Table IV shows that medical expenses (Medical and Hospital Insurance, Medical supplies, etc.) come well down in the list. The true picture is distorted by the fact that part of the personal tax goes to meet health expenditures. Including this, the proportion that the individual spends on health care (see page 108) is still less than that spent on clothing and much less than that on transportation. Rather than enter a futile debate on the matter of priorities and sense of values we turn to the more practical question.

Do people get their money's worth? When, as is so often done, it is pointed out that the curves depicting life expectancy, maternal and infant mortality have levelled off, while the cost curve continues to rise, the suggested answer is no. But how much value can one place on the enormous advances that have been made in diagnosis and treatment in the past twenty years? True enough these have not influenced the gross mortality figures for, generally speaking, the advances have been made in specific areas in few of which, fortunately, are large numbers affected: but it can be

said that the prospects of many thousands of people afflicted by a wide range of conditions are vastly better than they were twenty years ago. Is this enough to offset the first point? Who can tell? Here again one runs up against the impossibility of expressing health or well being in terms of money. But, further to this question, it is necessary to consider the system from the point of view of efficiency (clinical and managerial); *clearly to the extent that inefficiency or extravagance exists, no one is getting his money's worth.*

## Management Efficiency

No one would claim that Canada's system of health care is efficient. We have described some of its faults as viewed primarily by the patient. The economist, the industralist and the management consultant are much more critical. Meriting particular attention is the hospital which is sometimes described as an organizational maze. "The first and strongest impression that a tyro trustee, drawn from the ranks of business and industry, gets when he joins the board of a hospital is wonderment that the institution as organized, can effectively be managed at all".[3]

We have brought together the opinions of a number of management consultants. The faults emphasized were as follows:

– There are gaps between health professionals and administrators – between the care of the sick on the one hand and accounting and housekeeping on the other. The administrators came in for criticism for lack of understanding of organizational and managerial principles, for their slowness in making decisions and for their lack of concern for problems in the area of human resources. The doctors were found to be reluctant to enter into planning programs and to be highly suspicious of any attempt to economize. The propensity of doctors to inhibit administrative action affecting patients was noted.

– The government's centralized control on expenditures results in the delay of decisions on many important matters to a point where efficiency is difficult to realize.

– Hospitals, as institutions, were judged to be parochial, resistant to change, lacking in the ability to define goals and to develop measurement criteria.

– Information systems within hospitals are unco-ordinated.

The Task Force on Operational Efficiency[4] is "concerned that productivity based on industrial management techniques and standards has not been utilized to maximize the contribution of resources allocated to the health services industry".

There is no need here to be more specific than this. Our purpose is not to analyse the faults but to develop a concept of what efforts are being made to improve matters. To this end we have:

1) Corresponded with Management Consultant firms who have been active in the area of health care delivery;

2) Obtained some information on the ways in which hospitals are trying to effect improvements in the management techniques;

3) Listed the formal "groupings" of hospitals;

4) Listed the formal research projects in the management field; and
5) Commenced a study of the extent to which modern technological methods are being applied to the health field.

### Management Consultant Survey[5]

With a view to getting some measure (however oblique) of the seriousness with which governments, universities, hospitals, etc., are taking their managerial problems we canvassed Canadian and some U.S. and British management consulting firms, asking them to let us know what studies they had carried out in Canada during the previous six years. Twenty-eight consultants reported on work that they had performed in one or more of six designated areas of the health field. The number of studies carried out by each reporting firm ranged from one to six. The results are summarized in Table V. The figures show that a sizable number of studies (many of them very extensive) have been carried out in recent years. A summary of the opinions of some of the consultants is on page 111.

**Table V – Health Studies Carried out by Management Consultants**

| Studies done for: | Number | Type of Studies |
|---|---|---|
| Government Depts. of Health (Federal, Provincial, Municipal) | 18 | Internal Organization |
| Regional Health or Hospital Councils | 9 | Organization of facilities |
| University Medical Faculties | 5 | Organization |
| Hospitals | 69 | Organization. Management. Planning. |
| Clinics | 9 | Feasibility |
| Others | 20 | Miscellaneous |
| **Total** | **130** | |

*Source:* Science Council survey of management consultants.

### Hospital Survey

The Canadian Hospital Association (through their provincial associations) undertook to ask hospitals to reply to a questionnaire about research and innovation designed to improve the delivery of health care. Seventy-five hospitals responded. Table VI indicates the number of "projects" reported and we have listed in the Research List in the Supplementary Papers the titles of all those described as "studies".

**Table VI – Hospital Questionnaire Survey of Numbers of Studies, Reviews and Innovations by Province**

| | No. of Studies* | No. of Reviews† | Innovations‡ in use | Mixed Projects |
|---|---|---|---|---|
| British Columbia | 28 | 13 | 26 | 2 |
| Alberta | 28 | 6 | 16 | 22 |
| Saskatchewan | 21 | 3 | 18 | 12 |
| Manitoba | 7 | 4 | 6 | 11 |
| Ontario | 78 | 41 | 193 | 35 |
| Nova Scotia | – | 1 | 1 | – |
| Newfoundland | 1 | – | – | 4 |
| Quebec | 2 | 4 | 5 | – |
| **Total** | **165** | **72** | **265** | **86** |

*Studies: an evaluation of a procedure carried out in a manner likely to lead to a report.
†Reviews: a less structured look at a procedure.
‡Innovations in use: new activities now in use in the hospital whether preceded by trial or study or not.
*Source:* Canadian Hospital Association Questionnaire, sent at request of Health Science Study Group, 1971, to all Canadian hospitals.

Our impression from reviewing these data and from other even less formal inquiries is that many hospitals are making a significant effort, through research and trial, to improve their services. It became clear to us, however, that few hospitals know what others are doing. Hospital managers would benefit by knowing what was being done in the way of administrative research in other hospitals. Often, we suspect, apparently small administrative problems arising in a particular hospital are studied and solved and the administrator does not think it worth while to report the results formally in a journal. Yet other hospitals might find the information very useful. We suggest that a vehicle be established for the informal reporting of administrative research in hospitals. A possibility might be to set up a section in the Canadian Hospital Association Journal for this purpose.

**Interhospital Cooperation**

*Formal*

Formal interhospital cooperation has been mentioned on page 90: cooperation between hospitals in planning and in function should achieve savings in cost. We have identified eight formal groups [6] that have been established for these purposes. While here and there some progress has been made in achieving cooperation our impression is that on the whole the process has been a slow one. In looking for reasons for this, one comes first upon the individual hospital's reluctance to submerge its identity. Over and above this, one senses a lack of decisiveness. No one seems able or willing to force a decision. The governments are in some respects cautious, feeling their way. The hospitals individually are not particularly keen to change their way of life, and collectively are uncertain, because they cannot be sure that their decision will be respected: in several instances, governments have overturned the recommendations of these groups.

*Informal*

We have come across a number of instances in which arrangements have been made between hospitals and it is evident that the practice is becoming widespread. Some examples of cooperative effort are to be found in the discussion of the use of computers (Chapter VII).

The whole question of interhospital cooperation is hanging in the balance at the present time. Important moves have been made, and if relatively little has so far been achieved the reason appears to be a lack of direction resulting from the the fact that those who are in a position to direct – the Provincial Governments – are not clear as to what can and must be done. Before this can be known, a full study of each region must be carried out, the details of the capacity and function of each facility and of the demands upon it worked out, and a basic plan drawn up. The process is a long one. Quite apart from the time taken to amass the information and to work out a plan, provision has to be made for the equally necessary and time consuming education of those affected by the plan as to the necessity for it. It appears that a point is approaching in several places (for example, Sherbrooke, Toronto Metro and Hamilton) where effective action can take place. It is unlikely that it will take place without the full support, and if necessary, insistence of the government.

### Research in Management

In the Research List (Appendix 2 of the Supplementary Papers) there appear approximately 250 projects in the field of management. These were all "in progress" during the period of our study. Incomplete though the list is (for instance, a large number of hospitals did not report on the work that they were doing) it reveals a substantial research activity across the country. Matched against the need for research into the problems of management this output is still small. Of the limiting factors, probably the greatest is the lack of competent research personnel. Slowly a cadre is building up, but as things stand at the moment the shortage is acute. One particular weak spot is in the area of systems analysis and operational research. There are some strong points in the country, for example, the Hospital Systems Study Group at the University of Saskatchewan established in 1965; and several in early stages of development, the Resource Science Centre, U.B.C.; Dept. of Biomedical Engineering at McGill; Hôpital Ste. Justine, Montreal; and the Operational Research Group at Ontario Hospital Services Commission. These are already involved in important research. At the operational level there is need for expertise to apply operational research techniques to management problems, to implement and develop information systems and to evaluate medical equipment. In the larger hospitals a point of complexity has been reached where it would be advisable to establish a Department of Medical Engineering staffed by Biomedical engineers and systems analysts to carry out these functions.

Besides Medical Engineers, there is a shortage of those trained in Business Administration available to the field of health care delivery. Over the years, administrative posts in hospitals have slowly been filled by those trained for the job, but the supply of high calibre administrators is still small. If the system outside hospitals is to be revamped and if new institutions are to be formed (e.g., community clinics) many more appropriately trained administrators will be needed.

## Potential Savings

Besides what might be achieved by the improvement of management techniques generally, there are a number of ways that savings might be made. We have briefly described the main ones.

### Quality Control

With an effective means of quality control (medical audit, etc.) the incidence of poor treatment procedures and unnecessary operations, laboratory tests and drug prescriptions could be minimized. The improper use of hospital facilities (unnecessary admissions, delay in discharge) could be very substantially reduced.

### Rationalization of Payments

Rationalization of payments would eliminate areas in which the payments exceed the value of the service. Regardless of the method of payment, be it by salary or fee for service, there is a need to examine the bases of remunera-

tion with a view to eliminating overpayment wherever it may be found.

**Organization**

– A co-ordinated system of hospital, convalescent nursing homes, rehabilitation centres, home care and public health services, doctor's offices, and diagnostic centres would cut down on hospital misuse and reduce the need for building acute care hospitals. Time saved by patients would constitute an economic gain.

– The functional grouping of hospitals should result in savings in purchasing, laundry, etc., and in the reduction of duplication in certain clinical services.

– The grouping of doctors in practice should result in a reduction in overhead costs.

**Manpower**

– Increasing the output of Medical Schools would reduce the need for more schools.

– Introduction of Nurse Practitioners would reduce the requirement for doctors.

– Redistribution within the medical profession would reduce the number of specialists.

**Preventive Measures**

Accident reduction, health education and improved housing, nutrition and environment, by reducing the amount of illness, could lead to considerable saving.

**Medical Measures**

Improvements in diagnostic and therapeutic techniques could effect savings by shortening illness and lessening hospitalization.

## What is Now Being Done

**Management**

The importance of management is now fully realized. An appreciable amount of research is being done. The actual savings that can be effected cannot be calculated. Hospitals recently have been severely tested by the cutbacks in their budgets. The first cuts are usually made in the hotel function of the hospital. Once all possible cuts have been made there, the problem of cutting care functions appears. This problem will not be solved. It can be reduced by a much closer involvement of medical and nursing staff with the administration than now exists in most hospitals.

**Quality Control**

The second area in which early results in terms of cost reduction could be achieved is in quality control. There is considerable activity in developing methods of quality control. (See page 39.) These should, in our view, be greatly reinforced and speeded up.

**Rationalization of Payments**
A matter under discussion in every province and a subject of research by governments and medical associations is the question of the rationalization of payments.

**Organization**
The functional grouping of hospitals has started. It should be possible to calculate savings here. Co-ordination, where it exists, is still a local phenomenon. In no sizable area that we know of is there co-ordination. As it develops there may be some effect on cost. Cost reduction has been given as a reason for the establishment of community clinics. There are good reasons for starting community clinics in certain places: we doubt that saving money is one of them.

**Manpower**
There has been some increase in the output of medical schools and more is planned. A considerably greater output than now planned should be reached before new schools are built. A small start has been made in training nurse practitioners. This effort should be increased.

**Preventive Measures**
There is some research in the field of accident prevention but the effort is minimal in proportion to the problem (see page 134). The potential here for saving is very great. Efforts in health education are apparently ineffective (see page 135). There is a great deal of talk about housing, nutrition and environment and some research (e.g., Research List 46–113 in the Supplementary Papers). The efforts here are not yet great enough.

**Medical Measures**
There is great activity here in the field of research and trial.

# VII. Computers in Health Care

"Beware you do not lose the substance by grasping at the shadow"
—Aesop

The employment of computers will eventually have a profound impact on the practices of the health care system. Their application will impinge upon almost every aspect of the system from the monitoring and processing of signals from diagnostic instruments to the simulation of a national health care system. The potential is great; but so is the magnitude of the tasks ahead. Many expensive disappointments litter the last decade due to the frequent gross underestimation of the resources required to adapt computers to this most complex area of activity. Yet steady progress is being made and a cautious optimism is warranted.

## Hospital Management

### General Business

Most computer applications begin in a hospital by the adaptation of business programs to the hospital payroll which amounts to about 70 per cent of the budget. Other business systems follow, such as accounts payable and receivable, stock inventory. The value of this type of service is difficult to assess. Everyone has his own "horror story" in which a computer bug was the villain when a new business system was introduced. However, with service firms specializing in this type of work, programming and implementation skills are improving, and once the shakedown period is over these systems can be faster and more accurate than manual methods. Such precision is worth an undefined amount in terms of tranquility, especially where payroll is concerned. Further, modifications due to changes in union contracts or government regulations, such as the recent unemployment insurance legislation, may be accomplished quickly and, it is claimed, more economically, than would be the case with manual methods. The problem of turn-over in bookkeeping staff is also reduced; and the way is opened for the provision of more information to management than was possible manually. Conversion to a computer not infrequently follows a detailed survey of the hospital's business needs and cost estimates. For example, in Ontario some 30 to 40 hospitals have contracts with service firms and the Ontario Hospital Services Commission has assisted in both cost predictions and follow-up, and report[1] that the conversion to computer service is often a break-even situation regarding cost, but a gain from the standpoint of speed and precision. The fees charged vary considerably depending upon the system complexity. Service firms in the U.S.A. charge from $0.50 to $1.50 per patient day.[2]

A prominent trend on this continent is the voluntary grouping of hospitals for the sharing of computer services, particularly business functions. In Canada the following are some of the groups which share business services:

- In B.C., 47 hospitals are served by the B.C. Hospital Association;
- A similar system in Alberta is in the planning stage;
- A group of nine hospitals is working in Saskatchewan;

- A comparable system for small hospitals in Manitoba is run by the Manitoba Hospital Association;
- Nine teaching hospitals in Toronto share facilities at the Hospital for Sick Children;
- Eight hospitals cooperate in the Hamilton area;
- Twenty-two hospitals in Southwestern Ontario are initiating a shared service;
- The four McGill teaching hospitals use the computer in the Royal Victoria Hospital;
- Notre Dame Hospital provides services for the small hospitals in the Montreal area;
- In the Sherbrooke district 15 hospitals are cooperating.

In a number of the above instances the computer used is outside the hospital. Table VII shows the number of hospitals in the country which have in-house computers.

**Table VII – Hospitals Having Computer on Site, Including all Types: General Purpose Digital and Special Purpose Minicomputers**

| Classification by No. of beds | 1–49 | | 50–199 | | 200–499 | | 500+ | |
|---|---|---|---|---|---|---|---|---|
| | Hospitals | Beds | Hospitals | Beds | Hospitals | Beds | Hospitals | Beds |
| Municipal | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 634 |
| Provincial | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 647 |
| Other | 0 | 0 | 4 | 529 | 0 | 0 | 19 | 16 334 |
| *Total with computers* | *0* | *0* | *4* | *529* | *0* | *0* | *22* | *18 615* |
| **Total No. of hospitals with and without computers** | **680** | **15 073** | **451** | **45 488** | **196** | **58 843** | **103** | **94 361** |

*Source:* Information supplied by the Department of Communications Task Force on Computer Communications, Ottawa.

Management practices can merge imperceptibly into operational research and the use of computers for operational research in health care is a development of considerable significance. Almost every conceivable phase of the health care system from the details of nursing to the management of regional systems has been the subject of operational research studies,[3] many of them in Canada.[4] A review of currently funded projects in the Research List (Appendix 2 in the Supplementary Papers) shows some 37 programs which appear to have a significant portion of operational research in their make-up. (See Table VII.) Some, but not all, of these projects are computer based.

### Scheduling

One of the most promising of these techniques is the scheduling of patient admission and care. It is generally conceded that there are many gains to be made in operating costs by improved hospital scheduling. Yet experimentation with hospital procedures can be difficult and expensive; thus an operational research approach is indicated before major changes are undertaken. When choosing a technique for studying such a system, it is often the case that a purely mathematical approach must disregard many of the complexities in order to simplify the problem enough to fit a mathematical

Table VIII – Currently Funded Projects Involving Operational Research

| | Number of Projects | Project Number in Appendix 2 |
|---|---|---|
| Training | 4 | 128, 130, 539, 540 |
| Large Scale Modeling | 4 | 25, 112, 450, 496 |
| Hospital Management | 16 | 472–480, 609, 691, 692, 694, 697, 763 |
| Ambulance Studies | 2 | 537, 538 |
| Nursing | 3 | 253, 573, 581 |
| Operating Room | 6 | 241, 679, 680, 689, 690, 699 |
| Geographic Distribution of Admissions | 4 | 377, 474, 761, 764 |
| Emergency Department | 7 | 338, 339, 690, 734, 762, 772, 774 |
| Psychiatric Services | 2 | 321, 1 012 |

*Source:* Appendix 2 in the Supplementary Papers.

model. For this reason computer simulation has become an attractive tool for studying complex problems in this and other fields. The computer allows much of the detail to be introduced, provides a convenient and flexible method of linking one detail into another in a realistic fashion, and permits rapid analysis of suggested changes.[5]

Unfortunately, the construction and validation of a simulation requires time and this factor is frequently underestimated in the enthusiasm when deadlines for constructing models are being set. However, once a simulation is constructed considerable savings are indicated by such an approach. For example, Barnoon & Wolfe[6] performed a simulation of a scheduling system for an elective surgery hospital and claim an indicated saving of 30 per cent in both equipment and personnel. Presumably this arrangement is for the optimal adjustment of the system. Computer scheduling is not in common use. However a few Canadian centres, for example, Ste. Justine's Hospital in Montreal, are working on such systems and the Department of National Health and Welfare personnel are also interested in developing the techniques further. (For scheduling projects see number 475, 476, 478 and 697 in Research List, Appendix 2 in the Supplementary Papers)

### Admissions

Computers are used in mapping hospital admissions. Pertinent information may thus be displayed on the trend in patient origin, barriers or anomalies in services, etc. A system that has been adopted by a number of provinces to study patient distribution has been developed by members of the Department of National Health and Welfare. (See projects in Table 8: 377, 474, 761, 764.)

## Major Systems Management

Management of a provincial or national health program involves a bewildering set of constantly changing variables. Yet in an era when costs are beginning to be a major consideration, there is a requirement for improved management insight into these complex problems. One system of dealing with this sort of complexity is simulation on a computer. This is of itself an imposing task but has received a considerable amount of attention recently, particularly in the U.S.A. For example, GEOMET Inc. in Maryland has begun an ambitious project to simulate a health care system in the

U.S.A.[7] with components allowing for considerable detail in the population, delivery system, cost, and capitalization portions of the model with specific reference to the various types of medical care financing that are to be found in the U.S.A.

Since systems differ considerably between Canada and the U.S.A., the applicability to Canada of the results of such research is open to question. Thus, it may be essential that Canada do some of its own investigations. Simulations designed for major systems management purposes are being developed in Vancouver and Montreal.[8] Such models are able to accept demographic and morbidity statistics, combine them with models of the care system and the financial resources that support it, and hence give a projection of what may be expected in terms of health care for given resources expended. However, a critical feature of such models is the priority to be given to the care of different types of ailments, particularly those that are relatively uncommon and are expensive to treat.

These conflicts are difficult to resolve in any satisfactory way. But particularly when resources are limited the problem should be faced squarely. A reasoned rather than an intuitive approach is called for. Such problems have received a considerable amount of study and some progress may be reported regarding the development of mechanisms which may be employed. Fanshel and Bush[9] give a review of some earlier systems and present their own proposal for a Health Status Index. The purpose of this Index is to give administrators a means of objectively stating the relative weights that they would give to certain levels of health, and to provide a mechanism for using these weights and the prognosis of certain diseases to assess the relative values of proposed health programs. Dollar cost is not encountered directly in this type of assessment; however, it should be pointed out that the magic of mathematics is simply a tool here: it cannot remove from the administrator the burden of decision but only encourages him to be objective and consistent. Also, since the indices derived are based on subjective values, these may be expected to change with changing social values.

## Medical Information

Regarding the medical aspects of computer applications, one of the most dynamic areas at present is the development, by numerous hospitals and private firms, of Hospital Information Systems of different kinds. It is estimated by various workers that approximately 30 per cent of the time of hospital personnel is occupied with record keeping. Thus it is reasoned that if automation can lighten this burden it will have provided a valuable service. The business applications such as billing may be relatively unglamorous but they can provide a base for the applications which are of more interest to those who are concerned with patient care. First, the patient identity is established, usually at admitting, and kept in a central file with a few other fundamentals such as address and other identity. Normally, in a completely manual system such information is gathered in a number of places in a hospital, and much duplication of effort is encountered here.[10] The first thing an information system does is create a central file on the

computer on which may be attached in modular form all further information such as biochemical and haematology tests and diagnoses. If this record is assembled in a suitable way it may become part of a larger regional network of medical records to be used for care, research and administration.

The importance of developing this information, building slowly a step at a time to avoid disaster, has been emphasized by many writers. Unfortunately, with this slow approach the clinician will be one of the last to benefit. However, when such systems are developed they promise to provide increased accuracy and legibility of records, reduction of time spent on recordkeeping, and most importantly, the assemblage of a flood of data into a form more readily assimilated by the clinician. Sensing a large potential market, a number of private firms in the U.S.A. have information systems in various stages of development. A dozen firms are developing and leasing hospital information systems. The leading ones are named in a survey by the Minnesota Hospital Association.[11] Various hospitals in the U.S. are also developing systems, as is the Karolinska Hospital in Sweden.

In Canada, development has been carried on by several major hospitals which are proceeding with deliberate speed, watching various systems evolving, learning from the mistakes of others, and using a combination of borrowed, re-written and original programs. For example, the Toronto Hospital for Sick Children has a broadly-based program with business, medical information, scientific, and bio-statistical components.[12] Their system is evolving step-by-step and currently includes TV terminals at Admission, Records and at various diagnostic services that have not been installed since the optimal method of distributing information is still under study. Other hospitals with information systems in various stages of development are the Royal Victoria Hospital in Montreal, the Winnipeg General Hospital and the Ottawa Civic Hospital.[13] Further projects listed in Appendix 2, Research List, Nos. 487–500, deal with hospital and medical information systems.

**Cost Effectiveness**

These systems require time to develop if for no other reason than user acceptance. The cost of a broadly-based hospital computer centre may run in the order of $1 million per year; and several years time must be invested before major benefits begin to accrue. In the U.S.A. the more elaborate medical information systems can be leased for approximately $9.00 per patient day for a hospital with more than 200 beds.[14] It is not yet established if, or by how much, patient day costs will be reduced by such systems; however, cost information is being collected currently at the Baptist Hospital in Beaumont, Texas, and the St. Francis Hospital in Peoria, Ill., and their experience should be monitored.

One cannot expect too much from a cost-effectiveness study since the problem is so complex. The result depends upon a comparison of the effects on cost and effectiveness of the new method (computer) with what cost and effectiveness could have been achieved if the old method (manual) had been continued – a calculation that is difficult to make. If, for instance, costs were not reduced by the new system, but effectiveness was increased, the

cost of raising the effectiveness to the new level by the manual system would be a critical and controversial topic. Also some benefits will accrue from the analysis of procedures which should precede a computer installation and these will be difficult to isolate. Changing medical techniques and government regulations may similarly complicate the picture.

The dozen or so developers in the U.S.A. will soon be presenting Canadian hospitals with leasing proposals and the choice of "lease or build our own" will be encountered. Either decision will involve a considerable outlay and, to complicate matters, the systems will keep evolving.

### The Need for Centres of Excellence

In order to stay abreast of this technology it is essential to continue to support a *few* centres of excellence in the field. Duplication of work is excessively expensive and expertise is still in short supply. Should the information systems fulfil their promise there will still be the problem of having them generally adopted. This can only be overcome by having the benefits of the system clearly demonstrated. One potential benefit is a saving resulting from reduced personnel, another, more likely one, is a service that improves at a greater pace than its cost increases.

## Automated Laboratories

Automated clinical laboratories provide yet another focal point for computer development in the hospital. The accuracy of laboratories varies considerably and in the worst cases is the source of some concern.[15] Errors may be of many kinds. Even when an automated lab is introduced, there is the problem of clerical or technical error in the identification of the sample. A modification being introduced at Sherbrooke University Hospital can even eliminate this type of error with a number attached to the sample at the bedside. (Appendix 2 in the Supplementary Papers, Research List No. 532.) If the number is made machine-readable the patient's identity is then known by the computer at the automated lab. Most of the larger hospitals in Canada have their own automatic analysers and several are automated, with a dedicated minicomputer. (See Appendix 6.) Here, as in other areas of automation, techniques are still evolving. (Appendix 2 Research List Nos. 532–536.)

## History Taking

The physician normally spends a considerable amount of his time collecting from the patient the history of past events. Because of the pressure of time, too often the information is incomplete. In an attempt to alleviate this problem, the Cornell Medical Index was developed by Brodman and Associates at Cornell University in the 1940s.[16] This system used a four page self-administered questionnaire to be filled out by the patient before the interview.

As computers became more commonly available, patient interview systems were adapted to this tool and various methods developed by Coolen, Slack and Mayne.[17] These systems typically involve several hundred

questions and take 30 – 60 minutes to complete. The latter two systems involve branching questions. An advanced form of this questionnaire developed by Simmons uses on-line computer service and audio-visual aids to assist the patient. The patient is received by a receptionist, placed before a console and receives instructions on its use. He is then led by a branching set of questions to identify the part of his body that is troubling and the nature of the symptoms.

An interesting forward step in another direction was taken by Kanner[18] who, observing that a patient and a computer are often difficult to bring together, developed a system using a Selectric typewriter with a magnetic tape memory.

One application of computer interviewing has been introduced by Dr. Gerald Seguin of Plantagenet, Ontario, who has purchased a PDP 12 computer and is using the Mayo Clinic MMPI program in the office diagnosis of psychological and psychiatric problems. There are nearly 600 questions in this package.[19] In general, the advantages claimed for these systems are that the patient saves the physician's time so that the latter can concentrate on verification of the data which is imparted more readily to a machine than a person. Such systems, however, are not in wide use.

## Multi-Phasic Screening

Multi-phasic screening is the practice of putting patients through a battery of routine inspections and tests in one day, at one location, in a facility which is designed for that purpose. The advantages of this type of service are claimed to be:

- More rapid assemblage of information;
- Tests at one place more convenient and economical for patients;
- More thorough investigation;
- Earlier detection of abnormalities.

The system was pioneered by the Kaiser-Permanente group in the 1950s and computerized in 1964.[20] Their Oakland facility now processes 2 000 cases per month who are either new or repeat customers or persons from outside the insurance plan referred to the screening lab by their physicians. Tests received are electrocardiogram, weight and measurement, chest x-ray, mammography, glucose test, blood pressure, visual tests, ocular tension and retinal photography, Achilles reflex test, respiratory tests, hearing tests, self-administered medical questionnaire, various blood tests, urine analysis, psychological questionnaire and elective sigmoidoscopy and gynecological examination.

The results of these tests are ingested by the computer which goes through a program containing normal limits for such tests and decision rules for advised subsequent tests and/or the time before the next test is advised. If a serious abnormality is detected an earlier appointment with the physician is advised. An interview with an internist follows the tests.

Critics of the multi-phasic test, in general, claim that much of the testing is in vain, that it detects very few abnormalities that would not be detected in any event, and that getting abnormalities early has little affect upon the outcome of most diseases, but simply consumes more physician

time with worried people. (See page 137) The Kaiser-Permanente people readily admit they have no scientific answer for such a charge and that the effectiveness of the system is open to challenge. Since they continue stongly in its use they obviously feel it has merit.

## Record Linkage

For a definition of Record Linkage we could do no better than to quote H.L. Dunn:

"Each person in the world creates a book of life. This book starts with birth and ends with death. Its pages are made up of the records of the principal events in life. Record Linkage is the name given to the process of assembling the pages of this book into a volume."[21]

This process is a painstaking linking up of one event to another with the intention of finding clues about cause and effect in health care. Statistics normally available on hospital separations, for example, will tell a certain amount about the treatment and condition of the patient at the time of separation. However, what happens to the individual in subsquent years? Unless a special effort is made, valuable information may never be assembled.

Wilson[22] notes a study by Acheson which demonstrates that 40 per cent of deaths that occur elsewhere than in the hospital, within one calendar year of discharge, are unknown to the hospital. It would appear that an analysis of such information would be useful from a standpoint of assessing the efficacy of treatment received.

Another type of linkage is that required for the study of birth defects. This is particularly demanding as here the researcher is concerned not simply with one individual (the baby) but also the parents and, if possible, other forebears and siblings. In Canada a considerable amount of work has been done in this field by H.B. Newcombe of Chalk River, Ontario, working with the records kept by British Columbia's Registry of Handicapped Children and Adults. He has shown, for example, that, "after the birth of one stillborn child, the combined risk of still further stillbirths to the same mother and of child deaths and registrable handicaps among the liveborn brothers and sisters of the stillborn child is more than doubled. Where two previous children have been stillborn the risk is increased fivefold, and affects one child out of every three."[23] (For Canadian programs see the Supplementary Papers, Appendix 2, projects 523, 526 and 822.)

Critical to the process of record linkage is the matter of identification of the individual and relatives. It can be complicated by changing of first and last names, marriage, and so on. A universal identification number would relieve most of these problems and has been recommended by many authorities.

The types of study which might be undertaken by data linkage are given by the Medical Research Council of Canada.[24] The list below is compiled chiefly from that source.

*Environmental Causes of Ill Health*

- Socio-economic factors;
- Virus effects on pregnancy;
- Circumstances of delivery and later medical history;
- Physical environmental factors;
- Selection of unbiassed control groups for follow-up;
- Drug use monitoring;
- Risks associated with dietary and living habits.

*Diseases Caused by Specific Deleterious Genes*

- Hereditary diseases;
- Rates of mutation;
- Precipitating factors (eg., diabetes, multiple sclerosis, Huntington's chorea);
- Use of genetically identical twins to estimate genetic component of diseases.

*Population Changes*

- Declining fertility rates;
- Effects of other family events on fertility;
- Pre-marital pregnancy as a factor in divorce.

*Health Status of the Population*

- Numbers of people with given conditions;
- Risk of becoming affected by a certain age;
- Re-admission rates;
- Re-operation rates;
- Courses run by chronic diseases;
- Effects of family condition on prognosis.

The administrative use of record linkage is also of significance. The Federal and Provincial Governments maintain considerable stores of information on births, deaths, marriages, etc., in order to determine eligibility for certain services such as pensions, family allowances, etc., and a great quantity of record linkage is performed routinely by manual methods.

It is apparent that, where possible, records of value which contain medical, social and vital information should be maintained in a way conveniently readable by machine and be identified in such a way as to facilitate linkage. The advantage of an identification number assigned at birth, such as the one in use in Sweden, needs no elaboration.

The volume of information involved for Canada is estimated by the Medical Research Council report[25] to be, annually:

- Vital events, 1 million events;
- Hospital discharges, 4 million events;
- Contacts with the medical care system, 40 million events.

Further, a ten-year accumulation of the records of such events would be approximately $10^{12}$ bits of information representing some 80 cubic feet of magnetic tape. Magnetic tape is slow access; but faster access mass memories are being developed. For example, the UNICON 690 Laser memory for Illiac IV has a $10^{12}$ bit capacity. Thus, if it should prove desirable to

store this information in one fast access memory it will soon be technically feasible.

Although data linkage cannot confirm a cause and effect relationship between one event and another it can be a useful tool in providing clues or supporting hypotheses for the guidance of research in the bio-sciences. Thus, the desirability of taking steps which might encourage such research is apparent. Among the most crucial of the steps required is the establishment of regional health record systems. This problem is dealt with in the following section.

## Regional Record Systems

There is a fair amount of research and development being performed on the problem of storage, retrieval and content of medical records. Currently funded Canadian projects will be found in Appendix 2 in the Supplementary Papers, Research List Nos. 501 – 521. Several of these involve the development of a computer system, but only two are concerned with the construction of a regional system (515 and 519). The advantages of such systems, were they to be successfully implemented, are considerable:

- The rapid recovery of medical record and history;
- A legible record in organized form;
- The rapid transfer of information from one institution to another;
- A data base readily accessible for research and administration.

Some of the important difficulties that must be overcome involve:

- The identification of the individual by name and/or number but preferably both;
- The storage of vast amounts of information in a way which provides the essential features of rapid retrieval, volume of storage, and economy;
- The decision as to when information should be retired to magnetic tape and what information is actually useful;
- The provision of error-elimination techniques as the data are entered into the system;
- The protection of privacy of the individual whose information is in the data bank;
- The rapid recovery of information for statistical purposes in a way which conceals the identity of a patient;
- The rapid recovery of information which will provide a plain-language text for the physician consulting an individual record;
- Standardization of medical terminology.

These problems have been discussed at length by the Ontario Council of Health[25] and are being confronted on a programming level at a number of locations at present. Most of them have adequate solutions that have been developed at considerable cost in hardware, analysis and programming. Currently there are several projects of this type in the world which are funded as research but are intended as full, practical, operating systems. The *Kaiser-Permanente* system in Oakland, California,[26] has a population base of 1.3 million people, mostly subscribers to the Kaiser-Permanente medical insurance plan. The system is partially operational at this writing with data being stored in code but with retrieval in English not complete.

An estimated 50 man years of development have gone into programming plus a similar order of effort in physician-analyst time. A recently installed IBM 370-155 computer and eight 3330 disk packs provide the heart of the system which will store some 1.6 billion characters. Retrieval from the disk is in 0.03 seconds for either an individaul patient or statistical research. The disk storage is considered an interim solution and taken by itself costs about 12¢ per patient per year.

The *Danderyd Hospital* region system has the 1.4 million people in the greater Stockholm area as a population base. The project was started in 1967, is in limited operation and is intended for the provision of socio-economic as well as medical information.[27] The system is reported to cost $1.5 million per year with $3 million invested in equipment.[28] If this figure seems large it might be compared to an estimate by Lindberg[29] for the costs of a state-wide system; $3 million per year and $35 - 50 million for development costs. The establishment of the Danderyd system was considerably facilitated by already existing arrangements:

– All Swedes may be uniquely identified by a 10 digit official identification number;

– Information has been collected for some years on both in-patient and out-patient treatment in the Stockholm area; and

– A central population register was created from data already collected on magnetic tape by the State Office for Census and Tax Purposes. This information was made available and the system was built on this base.

The *Sherbrooke, Quebec*, project is a federally-financed program to demonstrate the feasibility of a regional record system. (Appendix 2 in the Supplementary Papers, Research List No. 515.) The project will use a UNIVAC 1106 to be delivered in June 1972 and it is planned to be in operation in 1973. The population base in the Sherbrooke area is 600 000 and all will eventually be included. At present about 98 000 records are on file. It is hoped that the information will be useful for administrative purposes as well, without compromising the privacy of the medical information.

This project will use two levels of storage: one on disk with access in a fraction of a second, will be for information which is considered medically urgent, the other, on magnetic tape, with access time in hours, will be for medical information which is considered non-urgent. The disk storage of the Sherbrooke project will, at least initially, be about one-tenth that of the Kaiser-Permanente system.

An interesting feature of the Sherbrooke system is the translation of diagnostic information to the SNOP code (Systematized Nomenclature of Pathology) developed by the National Institute of Health at Bethesda, Maryland. They are cooperating with the N.I.H. for the adaptation of the system to French language medical diagnostic terms so that it will be possible to go from English to SNOP code and retrieve in French, or vice versa. However, the SNOP handles only diagnosis and there are many other items on a record such as disability, test names, results, and interpretation which will require translation.

The Ontario Council of Health has recently published a report dealing with the problems of regional systems.[30] However, no further developments have taken place to this writing.

One question about regional systems which is frequently encountered is their optimal size. Using equipment such as Kaiser-Permanente now has, there appears to be little obstacle in increasing the size of its population base to several million providing additional storage is rented. Communication costs can be significant, thus the feasible size of a record system may be determined more by the density than the absolute size of a population. However, since the design of a system is sensitive to the factors of population distribution and size, geographical dimensions, provincial borders, state-of-the-art, and costs in both computers and communications, the best approach is ad hoc studies specific to each province or region and time of implementation.

It is noted that a large portion of the computer strength in various provinces' health care is concentrated in the government systems for the administration of payments for hospital and medical care. In addition there already is a type of medical record being kept at these centres. Thus, it has been suggested than such systems might be used as a foundation for the creation of regional record systems for some areas. If this approach were taken, the nature of the records kept would need to be changed to make them more medically significant, the access time of the data would perhaps need to be stepped up to real time and – perhaps more significantly – the purpose of at least part of these organizations realigned from insurance to service. Only a specific study would reveal whether or not such mutation would be feasible or desirable.

The many advantages of a regional record system will, it is felt, eventually argue successfully for their introduction. However, the need for care in this matter should be kept constantly in mind so that the privacy of the individual is always protected. Developers are keenly aware of this problem it has been found. Their concern must also be shared by those who make and carry out the regulations governing such systems.

The problem of privacy has been discussed at length in the report of the Ontario Council of Health mentioned earlier, and the need for adequate protective administration noted. For example, a body which authorizes access should be established, but this body itself should not have access. Since the information collected (names, addresses, etc.), may have many administrative uses in health, welfare and regional planning, the need for a protective body is apparent. A Crown corporation has been suggested as an appropriate agency for such a trust on the theory that this would be the best way to keep the agency free, in appearance and in fact, from pressures and temptations of political and private groups and individual scoundrels. Regarding central data banks in general, a rigid set of rules must apply in order to separate, and keep forever separate, the two functions of service and discipline in order to prevent the system from becoming deservedly unpopular and ultimately unworkable.

It has been noted frequently that a solution to a problem bears its own attendant problems. The introduction of computers to the task of recording and retrieval of medical and sociological information is a major innovation which may well have a considerable impact on our society. Prediction as to what form this impact will take will be as difficult as a prediction in the 20s of the effect of automobiles on our way of life. Thus, we must combine boldness in development with care in implementation.

## Research and Development of the Medical Applications of Computers

Research in computer applications is in a state of rapid development so that it is frequently difficult to distinguish R & D from application. However, the following areas seem to be chiefly research in nature. The rapid analysis of signals from various diagnostic equipment is a science which is considered to be one of the major breakthroughs in medicine since World War II. Usually a relatively small computer such as a PDP-8 is used which is capable of accepting analogue signals, converting to digital signals, and analyzing the information in this form. One of the benefits of this type of treatment is a synergistic combination between the diagnostic signal equipment and the computer. That is, together they may accomplish in real-time more than they could separately. The key is the speed and accuracy of the computer to analyse fleeting data which may be retrieved as part of an operative procedure when the patient is in considerable danger. The speed of analysis frequently permits rapid repetition of the test under slightly altered conditions until either the diagnosis is complete or the optimal condition is reached. Further, if fleeting signals may be treated in a sophisticated way it is possible to evolve new, non-invasive systems for tests that previously required operative procedures with the patient in either discomfort or danger.

This is a rapidly growing area of research and application which merits continued funding. Also, there is a need for an abstracting service at a national and/or perhaps international level to enable researchers and granting agencies to keep abreast of developments which are either published slowly or not at all.

### Monitoring and Intensive Care

A further application of the small computer is the monitoring of a patient in intensive care. The first stage of this development is the simple display of vital signs; the next is the triggering of an alarm when a given vital sign becomes abnormal; next is the possibility of deriving output information from raw data that have not heretofore been possible in real-time, making use of rapid data-processing techniques; the final stage is the more difficult "closing the loop" by automatic administration of a given drug, for example, to maintain a certain vital function at the desired level. Such applications are currently rare.

### Diagnostic Assistance

Stepping one stage back from the gathering of diagnostic data, how is it to be interpreted? Can computers actually assist the clinician make his diagnosis or determine what tests should next be taken? Many investigators claim that this is quite feasible and have, in various research institutes, evolved systems for computing the probability of given symptoms representing a certain disease. Thus far, isolated specialties are represented for demonstration purposes, for example, Gustafson on thyroid diseases and Lincoln and Parker[31] on liver diseases. The accuracy of this type of system is said to be comparable to that of a specialist in the area. Taylor[32] has evolved

a system for an interactive chain of decisions where the probability of a given diagnosis is altered as each test result becomes available until a diagnosis is virtually certain. Such probability computations would normally follow a rather extensive "decision tree" of responses or tests to name the area of investigation.

The value of a system such as Taylor has devised is not simply in determining a diagnosis. It is, further, a method of deriving a diagnosis in the most efficient way. Such a consideration is of importance in view of the increasing demands made on disgnostic services and the demands the output of these services make upon the information integrating ability of the clinician. Thus, a computer-aided diagnosis could both reduce the demands for diagnostic services and aid in the integration of test results.

A system of this nature, available to all clinicians and developed to store the sum of diagnostic knowledge in usable form, would be a great assistance to teachers, hospitals and isolated practitioners. The start of such a system is now operating in Zurich, Switzerland, as a European cooperative effort. Called ARITHMED,[33] it enables an isolated doctor to consult a computer bank by terminal, put in his knowledge of the problem and receive guidance in further testing and diagnosis. At this stage the information does not take the form of probability estimates but rather signed opinions of individual specialists.

The practical application of diagnosis by computer is theoretically possible and the notion is appealing. There is no question of the computers ability to deal with whatever data it might be presented; the problem lies elsewhere and consists mainly in deciding what data are usable and, once a decision, is made, in collecting them. So far, it is conceded, little progress has been made, but obviously there is an extraordinary potential in this area.

# VIII. Prevention and Promotion

It is indeed true, and a sad commentary on the times, that the thought, energy and money expended in treating diseases and injuries is much greater than that expanded in trying to prevent them.

There are some bright spots in the record, particularly (almost exclusively) in those situations in which prevention can be effected by relatively simple means that do not require great effort on the part of the public at large; thus vaccination and injections to stimulate resistance to various specific diseases (diphtheria, polio, etc.) have been spectacularly successful as preventive measures. Excepting some areas in the North and among the poor generally, where the proportion of the population protected is lower than it should be, and recognizing that elsewhere the limit of human tolerance of antigenic stimulation is possibly being approached, this performance can still be regarded with satisfaction.

Likewise in preventing exposure to certain other specific diseases great progress has been made. Water supply, sewage and garbage disposal, and food control measures, carried out or supervised by Public Health personnel, have been brought to a level of efficiency at which the filth diseases are rare.

## Apathy and the Failure of Prevention

Where the cooperation of people or the exercise of will power is called upon the story is different. For example, the evidence that smoking, eating and drinking too much, and taking drugs are harmful is substantial, and is certainly generally known: yet the number of people who pay no attention is high. All too often the individual's opportunity to prevent the diseases caused by overindulgence is missed.

More striking still is the general indifference to the toll of accidents, a high proportion of which could undoubtedly be prevented. The figures for road accidents alone should be frightening enough:[1]

There were in Canada in 1970

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|---|---|
| 498 839 | accidents on the road |
| 5 080 | deaths from road accidents |
| 178 501 | people injured in road accidents |

Based on the above figures it is estimated that there were:

| | |
|---|---|
| 1 785 000 | working days lost by the injured as a result of road accidents. |
| 1 010 000 | hospital bed days used by the victims of road accidents.[2] |
| $50 500 000 | spent on hospitalization |
| $ 5 355 000 | spent in medical care of the victim of road accidents. |

Accidents in general (of which road accidents form the biggest single group) are the leading cause of death between the ages of one and forty-four years of age. The loss of life, the disabilities and the economic loss are horrendous, but insufficient it seems, to rouse the public to demand the legislation and enforcement with respect to, among other things, speed, the drinking driver, vehicle safety devices, and driver education, that alone can pre-

vent this toll.

It is clear that what is required is more research to provide a basis for legislation and a more enlightened and effective form of public education on these matters. The research in this field (See Appendix 2 in the Supplementary Papers, Research List 878 – 940) is clearly inadequate for the task. Few of the projects are designed to search for root causes of accidents.

## Education of the Public in Health and the Proper Use of Health Care

"The greatest potential for improving the health of the American people is not to be found in increasing the number of physicians or in forcing them into groups, or even in increasing hospital productivity, but is to be found in what people do and don't do to, and for, themselves. With so much attention given to medical care and so little to health education and individual responsibility for personal health, we run the danger of pandering to the urge to buy quick solutions to a difficult problem."[3]

Public education in health matters may be considered in relation to:

– the promotion of health (how, why);

– information about illness, the available services and how to use them (when, who, how, why).

The benefits from effective instruction in these areas could be very great, yet neither the effectiveness of such educational programs as do exist, nor the best ways of educating the public in matters of health so that they actually do something about it, have been, so far as we know, studied in Canada. A search of appropriate Canadian and American journals and a study of annual reports of various agencies, both going back ten years, have failed to produce a single study on just how these important procedures might be made more effective in Canada.[4]

### Promotion

In the matter of promotion of health, as we have pointed out above, the efforts have been largely unrewarded. Campaigns designed to improve eating habits have been going on to a limited degree for decades, but every survey shows some people with poor eating habits. The relation of alcohol to automobile accidents has been established for many years and drivers are warned on all festive occasions, but the results of these educational efforts are not remarkable. For over a decade a relationship has been publicized between cigarette smoking and increased illness as well as shorter lives with the result that cigarette smoking declined between 1965 and 1970, but it is estimated that 44 per cent of males and 31 per cent of females over age 15 in Canada still smoke cigarettes regularly. Thus, the straight promotion of health still has far to go; indeed it would seem that the whole approach might be reversed. The theme of most educational programs which has been one of "dontisms" (don't smoke, don't drink, don't eat too much) has drawn little response. It is conceivable that the Behavioural Scientist might be able to devise a positive approach that would be more effective; he should be encouraged in this.

**Awareness of Available Services**

The details of health services and insurance coverage are so complex that it is rare to find a person fully aware of what is available to him or how to obtain it. Often he may wait for an appointment with a doctor to obtain information and direction that could have been given much sooner by telephone and by a less highly trained individual (see page 51).

An array of high quality health services, even if it were spread right across the country, is not truly "available" if many who are in need of them (and often contribute heavily to the ultimate cost) do not know about them or have not the attitudes or motivation to use them properly. Clearly, it is more important than ever to know how best to promote health among as many people as possible so that they do not require health care, and then to know how to influence people to use health care when it is first needed and to use it so that it may serve them best.

**Health Education**

This statement does not mean that nothing has been achieved in Canada in health education, but rather that health education continues to be based on blind faith, on strong personalities, on convictions of how to do things, and on a publicity approach. Schools, voluntary agencies, the news media, health departments, accident prevention associations, and, more recently, provincial hospital commissions and health insurance commissions all make attempts to inform their "publics" about various aspects of health.

*Schools*

In many schools health education has been on the curriculum for a long time. In addition to some basic information about the body and its functions, including nutrition and the dangers of alcohol, there is now a trend to include sex education, the dangers of smoking and drug taking, and the problems of adolescence. It is still far from uniformly provided and the results of such instructions are not clear, nor are they easily measured. So far as can be found, little is said in schools about systems of health care.

*Voluntary Agencies*

Voluntary Agencies, such as the Red Cross Society, and associations concerned with special conditions like cancer, diabetes, cerebral palsy or mental health have carried out sporadic or continuous efforts to educate the public. In some cases this education includes advice about special health services available, but only rarely has an attempt been made to measure the effects of such efforts.

*The News Media*

In regular "Health Columns", through the reporting of medical events, in articles by science writers, etc., the news media perform a great role in the dissemination of information of health matters. Little is known about their impact on health habits.

*Health Departments*

Federal, provincial, and community health departments have given health education as prominent a place as finances would permit. Pamphlets, posters, filmstrips and films have been prepared, sometimes after consultation with voluntary agencies, sometimes quite independently. It seems clear from annual reports that the supply of such health promotion materials is

rarely enough to reach the potential audience in any given situation, such as schools, clinics, or doctors' offices. How or where to get health care has seldom been dealt with.

*Industrial Accidents*

Industrial accidents have long been the subject of study and of efforts at prevention. There is perhaps more information about the effects of efforts to prevent accidents than in other fields. Outstanding work is achieved by such organizations as the Ontario Industrial Accident Prevention Association which supplies members with a wide range of posters, films, speakers, press releases, etc., and is currently (1971) participating in a study of the effects of exposing an entire community to intensive first aid training.

*Provincial Health Agencies*

Recently the provincial health agencies have tried to explain their services to their subscribers, and to the providers of care. Something more is likely needed than a leaflet in the envelope with a premium notice, especially to overcome the behavioural and attitudinal barriers to the proper use of health services.

There seems to be a complete lack, in Canada, of knowledge about what people want to know about health services, how they might learn to use such information and how they could be motivated to make the best use of health services. Only a considerable research effort, particularly in social and behavioural fields, can hope to provide some of the needed answers. Such research can, and probably should, go on even while much better co-ordinated and planned efforts are made to educate the public in all aspects of health as well as health care. Without such an effort to promote health and to prevent further disease and disability from the non-use of health services, the costs of health services will soar higher than necessary and the services themselves may be used in a way that does not satisfy the public's expectations from elaborate and expensive health services.

## A Note on Screening as a Means of Prevention

The concept of discovering a disease in its early stages and curing it before it can spread and do harm, or even kill, is firmly entrenched in most peoples minds. It is so sensible, so appealing to reason and, occasionally, so soundly based: the beneficial results of the early detection of pulmonary tuberculosis is the outstanding example. Thus there has been seen in recent years a marked interest in the screening of populations for a variety of purposes: to detect cancer here and there, cardiovascular disease, diabetes, metabolic upsets, visual problems and so on. As the computer becomes available to sort out data that can be accumulated as part of a screening procedure (and even collect some of it) the interest and the practicality increases.

### Some Doubts

But there are good reasons for being cautious; there are some doubts that screening is of any value except in the case of certain specific and rather uncommon conditions; there are hints that it may be harmful. Sackett[5] in a summary review of articles on the subject of screening debates the key questions:

1) Do periodic health examinations detect diseases likely to have an important effect on health?

2) Will the treatment of "risk factors" have a major impact on the subsequent development of disease?

3) What are the prospects that the health behaviour of participants in periodic health examinations can be altered?

4) Does the periodic health examination really alter disease outcomes?

5) Are we misled by traditional methods used in evaluating the effectiveness of early detection programs?

6) Have we considered the entire range of the possible effects of early diagnosis and long-term therapy?

He points out in response among other things, that periodic health examination programs fail to detect lethal diseases in about half the cases; that when a disease is discovered it is by no means certain that the patient, particularly if he is without symptoms, will modify his health behaviour for a prolonged period; that there is little evidence that early institution of treatment affects the course of many of the diseases for which screening is now done; that "labelling" an individual (who thinks he is healthy) as diseased or at high risk of developing a dreaded disorder may not help anybody, least of all the individual, unless the disease can be cured or the risk reduced – which is usually not the case; and that "with the exception of prescriptive screening among highly selected groups of individuals, existing screening and periodic health examination programmes carry no clear promise of improving or even maintaining the health of the general population and should not, therefore, be generally applied at the present time."

He urges support of research designed to determine the effectiveness of screening programs observing that "failure to follow a rational approach to this issue guarantees ... a marked increase in health care costs that accompanies the further evaluation and long-term treatment of presymptomatic disease."

The opinion is forthright and, we believe, sound. On present evidence, it seems unlikely that "mass screening" will prove to be worthwhile, although the matter is by no means settled. Relatively refined screening programs are underway (e.g., at the Kaiser-Permanente) and the results are eagerly awaited. Meanwhile, specific screening programs are of great interest and potential importance. A number of these were being carried out in Canada during the period of the study.[6] The list reveals a fair range of screening of various populations for different conditions, for example, for psychological, mental and visual problems, metabolic abnormalities, genetic hearing defects, cardiovascular faults, cancer, etc. Of these it should be noted that only eight (Appendix 2, Supplementary Papers, Research List 782, 790, 791, 794, 798, 810, 821, 823) are primarily concerned with the evaluation of the screening process itself.

**Pre- and Post-Natal Screening and Care**

If there is doubt about the effectiveness of mass screening of the general population in preventing disease or limiting disability, there can be none about the possibilities of careful scanning and care of the parents, the foetus and the newborn. The case is well put in a recent draft report.[7]

It is estimated that there are in Canada

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|---|---|
| 44 000 | cerebral palsy cases |
| 262 000 | mental defectives |
| 43 000 | epileptics. |

"It is currently uncertain what proportion of neurologically damaged infants could be avoided by properly co-ordintaed reproductive care utilising the full range of current knowledge of facilities such as genetic counselling, family planning for spacing of pregnancies, antenatal diagnosis, selective therapeutic abortion, foetal and maternal monitoring in labour and the optimal use of neonatal intensive care facilities. Current evidence previously cited suggests that it is probably considerable.

"It is sometimes argued that a reduction in perinatal deaths by proper reproductive care would result in an increased number of permanently handicapped individuals. This opinion is based upon studies carried out before the recent revolutionary changes in perinatal care. Present evidence, though still incomplete, suggests that the majority of these survivors will progress into adult life as useful citizens. Measures that prevent death may also prevent brain damage, as for example in the prompt and correct treatment of neonatal asphyxia, jaundice and hypoglycaemia."

Of all the areas to which increased immediate measures can and should be applied this, the preventing of a child being born with a serious disability of genetic, metabolic, mechanical or other origin, offers the greatest hope of return. On all grounds, particularly the humanitarian, but significantly those of cost, a concerted effort is fully called for.

## Pollution and Health

The effects of pollution on health are not, so far, well worked out. There is strong evidence[8] relating air pollution to respiratory disease of various sorts and there are suggestions that radiation, chemical pollution, noise, etc., have serious effects. The field is wide and relatively new. A review of the research projects related to pollution (Appendix 2 in the Supplementary Papers, Research List Nos. 46 – 113) gives some idea of the range of problems and of people who are interested in them. Involved in research are representatives of several departments of government (Health, Energy Mines and Resources, Agriculture, Environment Canada), of universities (departments in the Faculites of Medicine, Engineering and Geography), a Veterinary College, etc.

Most of the work is in the early stages and doubtless few results have been achieved. The necessity for co-ordination is, however, very clear. From the point of view of the Health Care System the greatest interest of the long list of projects arises from the recognition of the breadth and intensity of the effort now being devoted to what is, in effect, a new aspect of preventive medicine.

## On Prevention Generally

Innoculations, public health measures, educational programs and other subjects mentioned above are each directed toward the prevention of specific diseases, conditions or disabilities. Of the general or non-specific preventive measures there are two of special importance in the context of the health care system.

### Living Standards

The first, of course, concerns the *standard and mode* of living. It is often said that improvement in the way of life of people generally would do more to reduce illness and disability than any medical or paramedical measure. If this is true – no one is likely to doubt it – the achievement of tangible results is obviously a long way off. One sees just the beginnings of activity in governments and in the cooperation between the architects, the engineers, the social scientists, the behavioural scientists, the physicians and others which is so necessary if advances are to be made.

### The Physicians' Role

The physician, it should be noted, has a special role to play here: to identify the areas in which there is a connection between a social condition and a disease; to analyse the connection and to work with others to eliminate the fault. Physicians have come some way toward realizing that in so many cases the successful treatment of the patient is no more than a palliative to the underlying problem; that it is important to dig deeper than they have traditionally done; that only they can open up the clinical material to the social scientist who thus will be encouraged, indeed enabled, to work effectively in the health field. If a "better way of life" is the only ultimate solution to the problems of health it must be conceded that so far we have seen only the first glimmer of recognition of the sorts of things that might be done or tried to achieve it.

### Access to Sympathetic Care

The second non-specific general measure is of some immediate importance, however difficult its description or proof of its effectiveness may be. It has to do with the preventive or supportive value of a person's access to sympathetic care. It seems reasonable to suggest that the individual most likely to prosper is the one who is confident that he can get help and advice when he needs it and who, when he is sick, is tended by someone who can and will look beyond the limits of the illness itself to see what is happening to his home, his job, etc., and who will encourage him in every way to return to his normal activity.

This proposition, which might be advanced as one of the reasons to supplement the care that is now available by introducing the "Nurse Practitioner", is hard to support by fact. There is some evidence, however, which is of interest and, we believe, importance, in this connection. We have referred previously to an experience that has been gained in industry.

**Results in an Industry**

In a company with 40 000 employees the medical staff (of which 40 nurse practitioners comprise a large part) have, over the years, devoted an increasing proportion of their time to preventive services which consist mainly of health education, counselling, and assessment; in a word *contact*.[9] Figure 4 displays this graphically. In 1947 over 70 per cent of the employee visits were for treatment of an illness or an injury. Over a period of 27 years this proportion has dropped to just over 40 per cent while the number of visits for "Health Promotion" has risen to surpass those for treatment.[10]

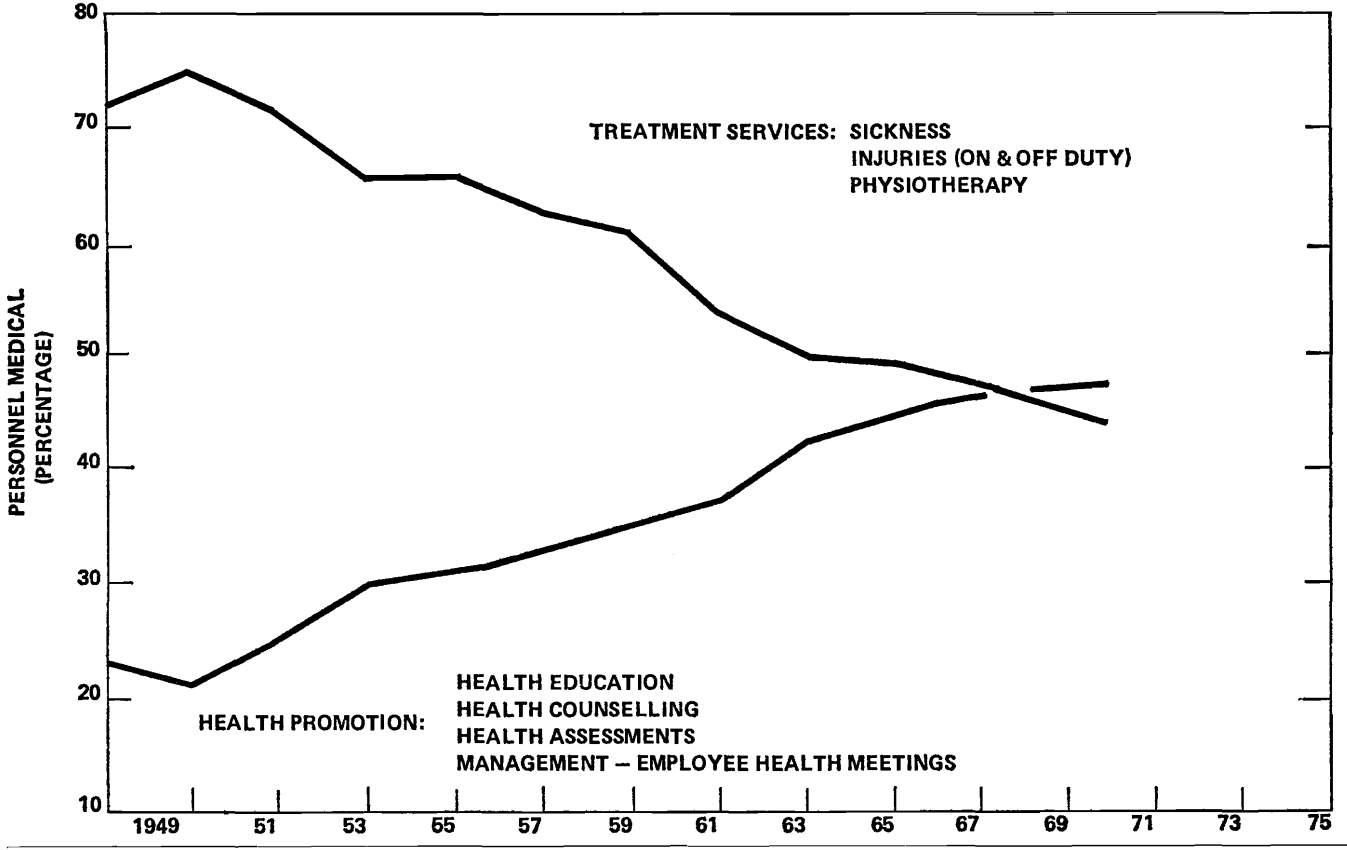
Coincident with this change in policy and practice there have been two events.

1) A very significant drop in the proportion of the employees off work due to illness each day, from 3.2 per cent in 1948 to 2.2 per cent in 1970.

2) A drop in the sickness disability payments per unit of payroll from a high of $17.50 in 1945 to $7.50 in 1970. (See Figure 5.)

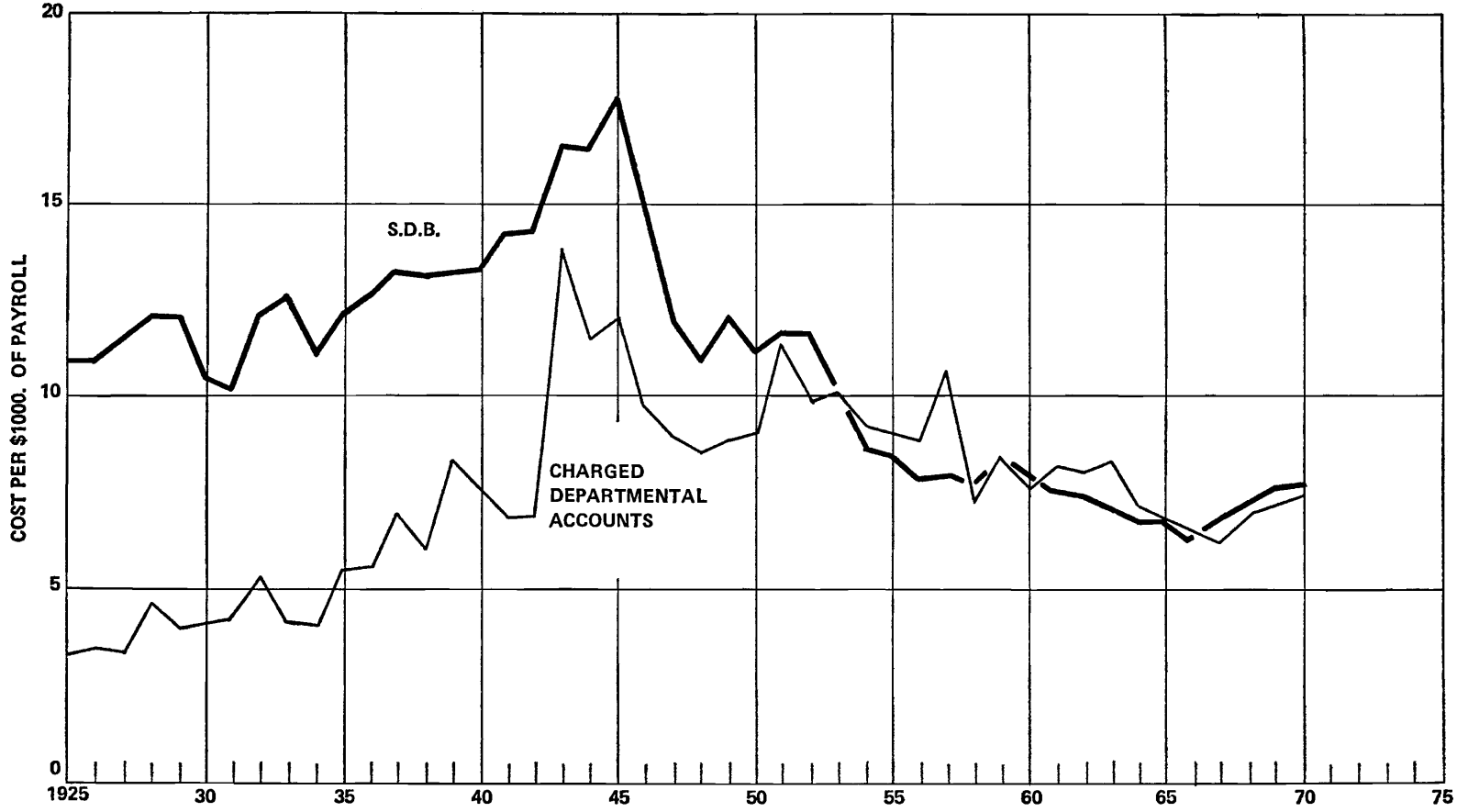
Standing alone these figures are highly impressive. If it would be going too far to suggest that they prove a direct connection between concentration on contact and improved results, they at least support the possibility to a point where we feel justified in suggesting that it would be wise to take as a working hypothesis that *an important factor in the promotion of health is the ease and the quality of contact between the individual and the health services.*

**Figure 4 – Changing Content of Health Program**




*Source:* Personal communication from Dr. D.C. Bews, Medical Director, Bell Canada.

**Figure 5 – Sickness Disability Payments**




*Source:* Personal communication from Dr. D.C. Bews, Medical Director, Bell Canada.

# IX. Research in Health Care in Canada

## Definitions

In considering the questions as to what should be included under the heading "Health Sciences Research" and upon what segments of this vast field we should, in this study, concentrate our attention, we concluded that we should first draw a distinction between Biomedical, Health Care[1] and Social Research.

**Biomedical Research** as we have regarded it, embraces research into the biological functions and disfunctions relevant to the health of people. Having decided to limit our inquiry to research related to the development of a comprehensive and co-ordinated system of health care, we have not listed any projects that fall into the category of Biomedical Research.

**Health Care Research** is concerned with the ways and means of delivering health care, and with research into the health system itself. We have viewed the health system as being composed of:

- Consumers,
- Governing and administrative bodies,
- Health professionals and all kinds of auxiliary personnel,
- Health facilities,
- Health aspects of other systems (e.g., agriculture, environment, industry).

| all involving | and interacting to |
|---|---|
| – Education, | – Promote health, |
| – Research, | – Prevent illness, |
| – Service, | – Treat illness. |

We have reviewed research in the field of health care as being composed of:

1) Research into the ways and means of delivering care, and we have taken a very liberal view of what constitutes research in order that we might include the numerous unsophisticated, yet practically important, trials that are being conducted.
2) Research into the system; which we have subdivided into:
   - Studies of the machinery of the system involving, for example, any aspects (quantitative, qualitative or functional, etc.) of administration, consumers, deliveries, facilities.
   - Studies related to the system's structure or function and studies (clinical or other) which show promise of leading to significant changes in the system.

**Social Research** we regarded, for the purposes of this study, as that dealing with the factors in society that influence people's health or their access to care.

With the above general principles in mind we have collected and classified as many as we could find of the Health Care and health related Social Research projects being carried out during the period September 1970 to September 1971. These lists appear as Appendix 2 in the Supplementary Papers.

## Some Generalities on the Nature of Health Care Research and Research Workers

Health care research is difficult. In it are melded, in varying proportions, the techniques and skills of many disciplines including epidemiology, statistics, economics, sociology, psychology, systems analysis, medicine. The level of competence required in this composite field is as great as in any of its parts.

Until recently, interest was low in this area – it has been the ugly duckling in research. Force of social circumstance and a slowly dawning realization that the discipline was, indeed, scientifically exacting and deeply interesting have brought about a change in attitude of researchers who, in slowly increasing numbers, are turning to this field. There is still, however, a marked shortage.

This problem has received recognition recently and steps have been taken, including the reservation of part of the New National Health Grant, specifically for the training of health care researchers and there is a marked increase in the activities in Medical Faculties (see Appendix 7 in the Supplementary Papers for the Health Care Research activity in each Medical School and Appendix 2, Section G, Subsection 1, "Research Positions"). But the field is still sparsely populated; not only by people working in Medical Faculties but particularly by those in other faculties who are so badly needed if a broad front is ever to be established.

Over and above the actual shortage of personnel, it is plain that the liaisons between those involved in health care research are poor – among these, the liaisons between preclinical and clinical members of the same Medical Faculty; Medical and other faculties; other faculties; departments within other faculties (e.g., between the Social Science Departments); university and government. The extent to which these liaisons can be improved is not known; it may not be great, for the tendency of the research worker to isolate himself is strong and such interdisciplinary liaisons as have been created in the past have, as a rule, been characterized by their fragility rather than their utility. But where an acute and interesting set of problems of national importance develops, the possibility of useful liaisons increases. This has happened during war and it may happen now in the health field. The social scientist, for example, may work with the clinician (perhaps the most fruitful bond that could develop) and the engineer with the hospital administrator, etc.

## The Division of Responsibilities in Health Care Research

*Universities*

While it is important that a considerable fraction of research and trials in health care remain concentrated in universities there are limits, still poorly defined, to the amount that can and should be retained there. There are limits of scale (space, people, money) beyond which the endeavour, particularly when it involves service, outstrips its teaching and research value; and there are important policy considerations involving the extent to which a university should become involved in the operation of things – in this case,

for example, a model health care system. If, as must be the case, a university is to preserve its critical role as "society's watchdog", it cannot involve itself intimately in the workings of society; it should, indeed it must, initiate, consult and assist wherever possible, but for a university to operate a major service venture would be for it to weaken its vital role as critic.

Thus, we believe, the place of the *University* in the spectrum of health care research lies mainly in long-term studies of all types (promoting wherever possible, interdisciplinary work), and in the operating of small scale demonstration models (e.g., Family Practice Units) which may serve the purposes of both research and teaching.

But this, of course, leaves out some of the research that is most urgently required at this point in the evolution of our health care system; the confined, relatively short-term study of a particular practical problem and the operation of large scale demonstration models.

*Government*

These primarily mission-oriented and sometimes massive projects should, in our view, be handled by government through in-house research, by contracting with individuals or small groups for confined and short-term studies, or by establishing Task Forces or "Institutes" to deal with the large and longer-term studies or trials.

The Provincial Governments would have an interest and responsibility in the problems related to their own specific situation (e.g., studies of patient flow in the setting up of a regional system) and the Federal Government would be concerned mainly with problems common to and useful for several provinces (e.g., the statistical and evaluatory projects).

**Funding of Research**

The money now available for health research (not including health aspects of research in agriculture, environment, etc.) is shown in Table IX.

*Adequacy of Funds*

It is hard to judge the adequacy of funds for research. There are three main factors involved: the problems of high priority, the number of competent research workers available and the funds. The funds are adequate if they are sufficient to support the work of all the competent workers in the field and if these are numerous enough to attack the items of high priority.

This situation must be very rare. The problems are endless and the supply of research workers, teachers, trainees and facilities is often limited. In practice there is a difficult balance to be struck between the amount of money to be spent on project support and trainee support.

For a number of years the policy of the Medical Research Council[2] and other granting agencies in the biomedical field of health (e.g., National Cancer Institute, Canadian Heart Foundation, etc.) has been to invest a considerable portion of the funds available to them in the development of research by supporting trainees. As a result of this there has been a steady build up of the number of people competent to do good research. The effect has been (and it is a highly desirable effect) that the demands for support have increased markedly. For the past three years, lack of funds

**Table IX – Major Sources of Research Funding in Canada (Current Expenditures), 1969–1972**

| Source | Amount 1969–70 | 1970–71 | 1971–72 |
|---|---|---|---|
| Medical Research Council[a] | $30 891 000 | $33 962 000 | $35 642 000[e] |
| National Health and Welfare | | | |
| Intramural | 6 314 000 | 5 436 000 | 6 605 000[e] |
| Public Health Grant | 3 942 000 | 3 588 000 | 4 551 000[d] |
| National Health Grant | 1 062 000 | 1 950 000 | 3 027 000[d] |
| Non Medical Use of Drugs | | | 228 000[e] |
| Other | 218 000 | 258 000 | 140 000[e] |
| Veteran's Affairs Department | 321 000 | 279 000 | 322 000[e] |
| Ontario Health Resources Dev. Plan[b] | | | |
| Demonstration Model Grant | | 895 000 | 1 615 000[d] |
| Provincial Research Grant | 955 000 | 1 255 000 | 1 197 000[d] |
| Conseil de la Recherche Médicale (Québec)[c] | 740 000 | 740 000 | 855 000[e] |
| **Total** | **$44 443 000** | **$48 363 000** | **$54 182 000** |

[a]Information from the Education, Science, and Culture Division of Statistics Canada.
[c]Information from Head, Provincial Research Grants, Research and Analysis Division, Ontario Ministry of Health.
[c]Information from Conseil de la Recherche Médicale (Québec).
[d]Distributed.
[e]Estimated
[f]This total does not represent total expenditures on health research in Canada but is representative of the bulk of governmental funding. The university counterpart of research grants and industrial funding are excluded.

has necessitated the turning down of a number of first rate proposals from highly competent researchers. Thus, in terms of our definition, the funds for Biomedical Research have become inadequate.

It can be anticipated that the demands that are generated for project support will increase steadily over the years and it is to be hoped that the number of recruits to the field will continue to grow; for whatever the optimum number of researchers may be, we are still far from it in practically all of the biomedical fields.

In the field of Health Care Research the process of development of research workers has just begun. Under the National Health Grants, fellowships have been granted (approximately 20 per cent was applied to personnel support in 1971–72). So far there are sufficient funds available to support all applications judged to be worthwhile in this field. While it might be said that the funds are adequate at the moment, this adequacy simply reflects the shortage of workers in the field.

Looking to the future it can be expected that in the case of biomedical research the requirements will continue to increase at least at their present pace, while in health care and health related social research, which has just gained momentum, the requirements will rise sharply.

*Funding Policy*

At the present time the funding of research is the subject of great controversy in Canada, as elsewhere. There are continuing debates about the role of the University and the Government in research; the divisions between basic and applied research and the amount of support each should receive; and about the administration of research funding. Our entry into these discussions[3] is confined to three aspects, the importance of which has impressed us during the course of our review.

1) We have previously (page 87) given our reasons for urging that the bulk of research should come from a federal source. There are two further points that should be made.

2) The second concerns the importance of maintaining one or more independent institutions whose whole purpose is to foster sound research in the field of Health Sciences. This involves the training and support of experts in the various disciplines, the co-ordination of research effort, the balancing of strength and, above all, an insistence upon high standards. Growth should be planned and controlled.

3) The third is to ensure a means of supporting research and trials in areas of particular current importance or of political sensitivity – things that need to be done immediately, that cannot wait to be fitted into the long-range planning of a research institution and that should not be permitted to displace any part of it.

As things stand at present the two latter desiderata are met by, in the first instance, the Medical Research Council and secondly, the Department of National Health and Welfare. This basic division, as we see it, is sound and should be continued. It is as necessary, we believe, for the former to remain free of political influence as it is for governments to be in a position to initiate research activity in areas judged to be of special importance.

Currently through the medium of the National Health Grant an impressive stimulus has been given to Health Care Research and work in the field of non-medical use of drugs is being supported. It should be emphasized, however, that while it is important for a government department to have the capability of supporting research in what might be termed "crash programs" it is also important that once the needs for, and feasibility of, a long term program of research are established, *the tasks of developing competent research personnel, of establishing priorities, of co-ordinating effort, etc., should be taken over by a non-political body whose whole concern is research.*

It is our view that the need for and the feasibility of Health Care research has been clearly demonstrated and that the time has arrived for the transfer of its support. But, to whom? To the Medical Research Council? To a Health Sciences Research Council embracing all research in the health sciences plus health-related social research? To a separate Health Care Research Council?

Among the further points that bear on the decision are the following:

– There is a real and obvious merit in bringing together Health Care Research and health-related Social Science Research. The most fundamental problems in Health Care research are sociological in a broad sense, and many of the researchers involved in the field have the same background and interests.

– The advantage of merging Biomedical research with Health Care research is much less evident. The cross linkages are, relatively, very few: a better balance might be maintained if they were kept apart.

– Such co-ordination as might be achieved by merging all the Health Sciences and health-related Social Sciences might well be effected in other ways (e.g., a co-ordinating committee) or at a higher level.

– Co-ordination of research should extend far beyond the range of the Health Sciences and its components to involve virtually all forms of research.

*Some Recommendations*

*For the Purposes of Co-ordination* we recommend that:

1) All Research Councils report to one Minister,
2) The Minister and Presidents of the Research Councils form an overall co-ordinating Board.

*For Functional Purposes* we recommend that the following councils are necessary:

1) A Council or Councils for the Arts and the Social Sciences
2) The National Research Council
3) The Medical Research Council
4) A Health Care Research Council

**The Need for a Health Care Research Council**

The need to form a Health Care Research Council at a time when the sum of money being spent is, relatively, so small, might well be questioned. In our survey of the situation we have been impressed by the extent to which things have developed in the space of a very few years. Taking into account the social needs, the progress that has already been made and the potential for future growth, together with the enormous complexity of the field, we feel that the sooner the direction of its development is entrusted to a special organization the better.

**The Continuing Role of the Department of National Health and Welfare**

While we have come to the conclusion stated above that there is an important, demonstrable need to establish a Health Care Research Council now, this in no way vitiates the view that the Department of National Health and Welfare will have to continue to be active both in doing research and in funding it in institutes, universities and industry. The nature of responsibilities will, however, change. With the creation of the Health Care Research Council the Department will be able to concentrate on supporting (or doing) research and trials of political sensitivity or of particular current importance to it. That is, the research vital to its own mission.

## The Benefits of Research

To support our view that funds for medical research should increase at a time when research in all fields is being subjected to careful scrutiny, we think it apt to make reference to the benefits that have accrued from research in Canada in terms of contributions to knowledge, of improvement in teaching, and in the medical care available to Canadians.

**Biomedical Research**

If the impact of the marked increase, in recent years, in the amount of money available for medical research is considerably reduced by the knowledge that the starting point was abysmally low, the progress that has been made in research and the effect that it has had is remarkable.

*Discovery*

Few in Canada realize the importance of some of the work that has been

carried out in the medical laboratories in their country in the last twenty years or so. To most people the discovery of insulin marked the beginning and the end of Canadian medical research. Unquestionably it is the highest point but it is not by any means the only one.

To present a list of important contributions is to risk accusations of boasting, inaccuracy, bad judgment and discrimination. On the other hand, if one intends to support a case, it is quite inadequate to say simply that Canadian contributions to knowledge have been great. We therefore elect to illustrate our point by naming, without any pretense at being exhaustive, some of the people who have made highly significant, internationally recognized contributions to knowledge.

In the field of *Brain Research*, Penfield's work on brain localization, Hebb's demonstration of the effects of sensory deprivation, Lehmann's method of the introduction of the tranquillizing drugs, have been of the greatest importance.

In the *Endocrine system*, maintaining the impetus of the discovery of insulin, Canadian workers have played an important part in the world picture with the outstanding discoveries of Collip, who described parathormone and Copp who recently demonstrated a new thyroid hormone (calcitonin) which, besides having direct clinical application, has stimulated a new interest in feed-back endocrinological concepts.

In *Cancer*, Canada has been well represented by the work of Johns, who developed the Cobalt bomb, now universally used in cancer treatment; of Noble whose Vincoleukoblastine is also used throughout the world in the treatment of certain forms of leukaemia; and of Friedman and Gold whose recent discovery of the chorioembryonic antigen is likely to mark an important phase in the development of techniques of cancer detection.

In *Genetics*, the work of Barr in sex chromosomes is world renowned for its fundamental importance. Included in this connection might be Chown's contribution to the diagnosis of Rh disease and to the development of the Anti Rh factor which is now universally used with great success.

The field of *Surgery* has been enriched by several, notably Mustard who developed a successful operation for a congenital condition previously hopeless (transposition of the great vessels); Bigelow, who directed a team that contributed very significantly to the knowledge and use of hypothermia and in many facets of open heart surgery; and Vineberg, whose work on revascularization of the heart muscle is widely acknowledged and followed.

In *Orthopaedics*, Salter demonstrated in his laboratory the effects of dislocation of the hip in infants and, on the basis of his findings, devised an operation which is now the standard procedure the world over for the correction of this common congenital deformity.

The potential of Chang's use of microspheres containing reagents for biological function (already shown to be of practical value in renal dialysis) has been widely recognized; while, to end an admittedly very incomplete list, Leblond's development of radio autography has led to important advances in the understanding of the function of cells.

The above account, foreshortened as it is, is in our view sufficient to illustrate the point that medical research in this country has been pro-

ductive. Beyond both the practical value of these discoveries and the feeling that one's country has contributed to the general pool of knowledge, benefits derived from the spin-off of work of this calibre is bound to be great in terms of the inspiration to youths inclined to research, and of the setting of high standards with all that that entails.

*Teaching*

That the teacher should engage in research is an old maxim that is being tested, to some extent, at the present time. The concern of some students (and people generally) is that the teacher's absorption in research separates him from both his students and the most burning problems of society. There is certainly some basis for this concern – quite sufficient to warrant a careful review of our teaching-research relationships and our priorities; but surely the maxim still holds, surely the inquiring mind that must explore is the one that will arouse the interest of the students! The point cannot be proved. There is no way of measuring the effectiveness of teaching and hence the influence of the teacher's research upon it can be no more than a matter of opinion. Our own is that the spreading of research in our medical schools has been a factor that has led to vast improvement in teaching.

*Practice*

The beneficial impact of research and research-minded people on the standard of practice in a community is less likely to be challenged, even though it is still hard to define clearly. The spirit of inquiry spreads far beyond the laboratory and the teaching hospital wards to reach the practitioner in his office and leads him to ask questions that otherwise would not arise.

The people with special knowledge and equipment that concentrate in a research centre form a core of consultants that raise the diagnostic and treatment potential to a level otherwise unattainable. Furthermore, it can be asserted that without research facilities and personnel, prompt local development of advances cannot occur. The research worker will be alert to developments wherever they are occurring: he is "coupled-in" to the advances and is in a position to study new procedures and to adapt them to local conditions.

In short, *research of a high calibre is absolutely essential to the provision of first rate service.*

**Health Care Research**

If the case for biomedical research can be well argued on the basis of past performance, that for Health Care research rests largely on present necessity and future possibilities, important among which are the promotion of health and the prevention of disease.

We have discussed in various sections of this study the present necessities. They are obviously very real. The extent to which research (broadly defined) will contribute to the solution of the problem of health care is impossible to predict; there is every reason to believe that it will be very considerable.

## Manpower for Research

*Government*

In most of the *Government Departments of Health*, Federal and Provincial, there has been, during the past few years, a build up of staff whose work is largely of a research type concerned with manpower, economic, organization, and management studies. In every case the process of determining the areas of research and of acquiring the staff is still incomplete, nor is it often possible to separate research from service. For these reasons, we have not attempted to list the research activities (except for certain specific areas) of the health departments. We are in a position, however, to say that both the present effort and the potential are very considerable.

*Universities*

THE FACULTIES OF MEDICINE

We have recorded (Appendix 7 in the Supplementary Papers) some of the newer activities in health care teaching and research in the Canadian faculties and the School of Hygiene of the University of Toronto. It can be seen that all the medical schools are now deeply involved in this field. In seven of the faculties special departments have been established for the purposes of concentrating on health care research.[4] Two other faculties are planning to do this, while six other existing departments (e.g., community medicine, epidemiology) have expanded to take on this work.

We have failed to get an accurate figure for the number of graduate students working toward a career in health care research. To be able to do so one would have to have a much more clear cut definition of the field (particularly difficult in sociology and psychology and not easy in any discipline) and of the intentions of the students. Grants to support research positions and fellowships are shown in Appendix 2, in the Supplementary Papers, Research List Nos. 965–1001.

DEPARTMENTS OF SOCIAL SCIENCE

1) Sociologists

Until recent years the work of sociologists in the health field was not extensive. Gradually, over the past five years interest has swelled, as evidenced by the attendance at the three Workshops on Social Science and Health in Canada (1969, 1970 and 1971), proceedings of the first of which have been published.[5] The appointment of sociologists in Faculties of Medicine in several universities is also to be noted. In an attempt to get some idea of the volume of sociological research in health at the present time we have gathered together all the projects that appeared to fall in this category. (See Appendix 2 in the Supplementary Papers, Research List Nos. 1015–1137.)

2) Economists

A list of economists particularly interested in the economics of health care is being prepared by Professor Ruderman of the University of Toronto, Research List No. 1009. Health economics research projects have been listed in Appendix 2, Research List Nos. 1038–1169.

OTHERS

Health research activities are springing up in a number of other places within and outside the universities and governments. The Hospital Medical Records Institute (Ontario), Hospital Systems Study Group (Saskatchewan) and Ontario Health Insurance Commission are examples. Besides these there is a substantial amount of research in administration and management being carried out in hospitals, all of which is using (and, in many cases, training) manpower.

Very few of the activities described above are older than four years – a measure of the shortness of the time that the seriousness of the problems which are now being tackled has been appreciated. It can be said that a good, if late, start to develop expertise in this field has been made.

**The Adequacy of Research**

As stated in the preface one purpose of the study was to examine the overall level, adequacy and appropriateness of research related to the development of a comprehensive and co-ordinated system of health care. In an attempt to achieve this purpose we have tried to identify the faults in the system and to find out what is being done by way of research and trial to correct them.

A precise analysis of the faults is impossible for there are so few facts available, but there can be no doubt that there are serious deficiencies in both the preventive and the treatment aspects of the system. In order to find out what is being done to improve the situation, we decided to seek information from the government departments, universities, various special groups and professional associations, hospitals, management consultants and other. (See Appendix 5 in the Supplementary Papers.)

From these numerous sources we have brought together all those projects in progress or completed between September 1970 and September 1971 which we considered fell within the sphere of our particular interests. (See Appendix 2 in the Supplementary Papers.) Needless to say, the process of selection and classification of these research projects involved innumerable judgments which cannot always have been sound and consistent. Nor, extensive though it was, can our search for material be regarded as complete. Undoubtedly, there are sources that we have not tapped and we know that the information we have obtained from several is deficient. These instances have been fewer than we might have expected, and we have reason to believe that we have uncovered a representative sample in each area of immediate interest to us.

We have included a considerable number of investigations and trials that would not, under more stringent conditions, be accepted as research. Many of the pilot projects and the relatively informal surveys of doctor's practices, etc. are listed because, however unsophisticated they may be, they represent genuine efforts to establish facts that might be of value to those seeking information on various aspects of the health care system.

The list of research projects is, in some respects, impressive. There is a lot being done. But is it adequate? The answer is plainly no. Relative to the number of obvious faults, the efforts to correct them are all too sparse and, like the very system they aim to improve they are unco-ordinated. But, as

we have repeatedly pointed out, the field is a new one and the start that has been made in Canada shows promise.

## References


### Introduction

1. Canada, Parliament, House of Commons Special Committee on Social Security, *Health Insurance Report of the Advisory Committee on Health Insurance*, Chairman, John J. Heagerty, King's Printer, Ottawa, 1943.

### I. The Quality of Health

1. K.L. White, Evaluation of Medical Education and Health Care, from *Community Medicine*, by W. Lathan and Anne Newbery, Appleton-Century-Croft, New York, 1970.

2. "Health is a state of complete physical, mental and social well being and not merely the absence of disease and infirmity". (Constitution of the World Health Organization, Washington, D.C.)

3. In a submission to the Special Committee on Poverty in February 1970, the Department of National Health and Welfare reported that in 1968, the infant mortality rate was 21 per 1 000 live births for all Canadians, 49 per 1 000 for Indians and 89 per 1 000 Eskimos. The "Life Expectation" of the "average Eskimo infant" in the Northwest Territories at birth appears to be just over 50 years. For the "average Indian infant" it is just over 70 years. (*Life Expectancy of Canadian Eskimos*, a publication of the Department of National Health and Welfare, Queen's Printer, 1968, 4 pages.)

4. According to the International Abbreviated List of 50 causes.

5. Britain, Ministry of Health, *The Annual Report of the Chief Medical Officer, 1966*, Her Majesty's Stationery Office, London, 1967, page 26.

6. The needed improvements have been clearly specified in the Ontario Council of Health *Report on Health Statistics, Part, I*, Department of Health, Annex G., Toronto, 1969, 53 pages; and the Ontario Council of Health *Report on Health Statistics*, Supplement No. 2, Part 2, Department of Health, Toronto, 1970.

7. The Canadian sickness survey of 1950/51 was a major effort of this sort. A selected sample of 10 000 households was interviewed monthly for a year by trained enumerators, following pretested forms and questionnaires. A degree of uniformity was achieved in each province by special methods. More recently "Surveys of various population groups" have been carried out (See Chapter II).

8. Research List No. 25 in Appendix 2 of the Supplementary Papers.

9. Much study is required to determine the nature and timing of the surveys. By "Canadian Health Survey" we mean a series of surveys, some repetitive, some attacking topical problems.

### II. The Quality of Health Care

1. Editorial, "Mechanisms and Purpose", *The Lancet 1*, Boston, January 7, 1950, pages 27–28.

2. There are a number of examples of organized methods of quality assessment and control in Canada (hospital accreditation and some of the Medical Insurance schemes, in various treatment services) that have been

in action for many years, but the increase in this kind of activity has been slow. To run a good program of this sort takes a lot of conviction, energy and sometimes money. Those whose work is being investigated have to swallow some pride and surrender some privacy. The sum of these amounts to a formidable obstacle.

3. See page 68.

4. The words prevalence and incidence may be confusing. Prevalence here refers to the number of cases present at any given moment. Incidence means the number of new cases developing over a period of time.

5. Hospitals accredited by the Canadian Council on Hospital Accreditation are required to have and to operate the machinery for medical care evaluation. Approximately 40 per cent of the hospitals (containing over 60 per cent of the beds) in the country are accredited. (See the new *Guide to Hospital Accreditation*, the Canadian Council on Hospital Accreditation, Toronto, 1972, regarding the outline of hospital medical care evaluation.)

6. See page 44.

7. Paul A. Lembke, and Olive G. Johnson, *A Medical Audit Report: Comparison of the Findings in a 200 Bed Suburban Hospital with those in University Teaching Hospitals*, University of California School of Public Health, Los Angeles, 1963, 291 pages.

8. Surgical operations (including gynaecological and obstetrical), incidence of various types, indications, complications and mortality rates. Maternal and infant complications and deaths, analysis of all deaths considering possible preventability, etc.

9. Kenneth F. Clute, *The General Practitioner, A Study of Medical Education and Practice in Ontario and Nova Scotia*, University of Toronto Press, Toronto, 1963, 566 pages.

10. *Evaluation of the Quality of Nursing Service*, Canadian Nurses Association, 50 The Driveway, Ottawa, 1966.

11. Canadian Bureau of Statistics, *Illness and Health Care in Canada; Canadian Sickness Survey 1950–51*, Queen's Printer, Ottawa, 1960, 217 pages.

12. See Appendix 11 of Supplementary Papers.

13. Appendix 11 and Stanley Greenhill, *What Does the Public Want of Health Services? The Need for Some Health Indices*, A paper presented at the Annual Meeting of the College of Family Physicians of Canada, Banff, Alberta, September 1971.

14. World Health Organization, *International Collaborative Study of Medical Care Utilization, International Comparisons of Medical Care*, Nos. I to VI, Papers Presented to the Medical Care Section, American Public Health Association, 99th Annual Meeting, Minneapolis, Minnesota.

15. A. Adams, A. Chancellor and C. Kerr, "Medical Care in West Sydney, A Report on the Utilization of Health Services by a Defined Population", *The Medical Journal of Australia*, March 6, 1971, pages 507-516.

16. Bureau of Economic Research, Canadian Dental Association, *Survey of Dental Practice*, Toronto, 1963, 109 pages.

17. Dominion Bureau of Statistics, *DBS Weekly Bulletin*, Ottawa, April 24, 1970.

18. In most provinces, the main data include, for each doctor, the number of patients seen, cost, geographical sources of patients, services performed, the laboratory work generated, the consultations sought, the diagnosis made.

19. John M. Last, *Measurement of Quality of Care and Medical Audits*, revised working paper from the International Conference on Health Care Evaluation, McMaster University, Hamilton, Ontario, May 24–28, 1971, 23 pages.

20. A non-profit organization operating under a Board on which are represented the Ontario Hospital Association, the Ontario Medical Association and the Ontario Association of Medical Record Librarians.

21. A system of audit based on data compiled by the computer centre of the Notre Dame Hospital is utilized by twelve hospitals in the Province of Quebec.

22. Personal communication.

23. See page 38 and footnote 2.

24. These are simple extensions of the recommendations of the Royal Commission on Health Services (Nos. 95, 96, 97 and 99). See Supplementary Papers, Appendix 10, page 10-5.

**III. The Quality of the System**

1. *Times Literary Supplement*, London, 21 May 1971, page 758.

2. See page 100.

**IV. The People Involved in Health Care**

1. See Appendix 10 of Supplementary Papers.

2. For example see: Department of National Health and Welfare, National Health Manpower Conference, Ottawa, 1969; National Conference on Assistance to the Physician, April 6–8, 1971, Report from Information Canada, Ottawa, 1972, 142 pages; Task Force Reports on the Cost of Health Services in Canada, Chairman of Committee, Joseph W. Willard, Information Canada, Ottawa, November, 1969, Three Volumes.

3. National Health Grants.

4. Abraham Flexner, *Medical Education in the United States and Canada*, A report to the Carnegie Foundation for the Advancement of Teaching, Bulletin No. 4, 1910, 846 pages. Reprinted by Merrymount Press, Boston, 1960.

5. Research List Nos. 292–304 in Appendix 2 of the Supplementary Papers.

6. It is interesting to note that Flexner, who is so often nowadays blamed for the over-emphasis on science in Medicine, had even more foresight than generally recognized. In a little noticed, but now highly significant part of his report of 1910 he says: "The reconstruction of our medical education ... is not going to end matters once and for all. It leaves untouched certain outlying problems that will all the more surely come into focus when the professional training of the physician is once securely established on a scientific basis. At that moment the social role of the physician will generally expand, and to support such expansion he will have a more liberal and disinterested educational experience."

7. See Appendix 11 in the Supplementary Papers.

8. The concept of a comprehensive system of health care on a regionalized basis, with co-ordination of the health and social services is far from new. Such a plan was recommended in Great Britain by a Consultative Committee on Medical and Allied services under the chairmanship of Lord Dawson of Penn in 1920 and it bears a striking resemblance to schemes now suggested for Canada. Many of these recommendations were acted upon 30 years later with the introduction of the National Health Service but some have still not been fully effected (i.e., Regional Health Authorities, close liaison between Health and Social Services, Community Clinics).

In Canada we have recognized the need of reorganization of our Health Services for a long time as revealed by J.J. Heagerty in the *Report of the Advisory Committee on Health Insurance*, 1943, in which it was suggested that comprehensive plans for health care be developed. The Report of the Royal Commission on Health Services and all subsequent reports carry the same theme.

9. John R. Evans, *Co-ordination of Educational Programs*, Speech delivered at 2nd National Conference on Health Manpower, Ottawa, October 21, 1971, 25 pages.

10. See Appendix 7 in the Supplementary Papers.

11. Moyra Allen and Mary Reidy, *Learning to Nurse. The First Five Years of the Ryerson Nursing Program*, The Registered Nurses Association of Ontario, Toronto, 1971, 270 pages.

12. By the College of Physicians and Surgeons of Quebec.

13. Kenneth F. Clute, *The General Practitioner, A Study of Medical Education and Practice in Ontario and Nova Scotia*, University of Toronto Press, Toronto, 1963, 566 pages.

14. *Ibid.*

15. The newer types of objective examinations (see page 66) are to be useful in testing judgment and ability to perform. This possibility should be followed up but it should not delay the start of a program of recertification.

16. See Chapter II.

17. The number of Boards in each region would depend on several local factors, i.e., the number of doctors, of specialities represented, etc. An objective would be to have it so that each Board would be competent to judge on the individual case.

18. See page 43.

19. U.E. Reinhardt, *Physician Productivity, the Supply of Physician Services and the Physician Shortage in Canada*, Paper presented at the Fifth Annual Meeting of the Canadian Economic Association, Ottawa, June 3–5, 1971.

20. Department of National Health and Welfare, *Report of National Health Manpower Conference 1969*, Ottawa, 1969, 305 pages. Canadian Graduates 1 016, Immigrant Physicians 1 345.

21. John R. Evans, *op. cit.*

22. R. Nelson-Jones, and David G. Fish, "Projections of Graduates from Canadian Medical Schools 1970–71." *Canadian Medical Associaton Journal*, April 25, 1970, Vol. 102, pages 850–854.

23. We cannot make any precise estimate of the extent to which the

enrolment of each Medical School can be increased. In the present critical situation it is clearly incumbent on each school to make use of every possible way of maximizing its output.

24. Personal communication from Dr. William J. Copeman, Medical Officer, Programme for Underserviced Areas, Ontario Department of Health, Toronto.

25. In February 1972 some 202 students were actually on the Bursary Programme.

26. *The Community Health Centre in Canada*, Report of the Community Health Centre Project to the Conference of Health Ministers, Chairman, Dr. J.E.F. Hastings, Department of National Health and Welfare, proposed publication date 1972. (Editorial note: This report has since been published as a special supplement to the Canadian Medical Association Journal, August 19, 1972, Vol. 107, pages 261–380.)

27. Research List 282–291, Appendix 2 in the Supplementary Papers.

28. E.F. Hughes, V.R. Fuchs, *et al.*, *Surgical Workloads in a Community Practice*, National Bureau of Economic Research Inc., New York, 21 pages.

J.P. Bunker, *Surgical Manpower: A Comparison of Operations and Surgeons in the United States and in England and Wales*, January 15, 1970, Vol. 282, No. 3, pages 135–144.

Victor Fuchs, "Improving the Delivery of Health Services", *Journal of Bone and Joint Surgery*, March 1969, Vol. 51-A, pages 407–412.

W.P. Longmire, Jr., *Problems in the Training of Surgeons in the Practice of Surgery*, July, 1965, Vol. 110, pages 16–20.

J.V. Maloney, Jr., "A Report on the Role of Economic Motivation in the Performance of Medical School Faculty", *Surgery*, 1970, Vol. 68, pages 1–19.

P.G. Masson, T.C. Moody and J.D. Stubbs, *Planning and Control for Community Hospitals, A Case Study of the Cambridge Hospital*, Alfred P. Sloan, School of Management, Massachusetts Institute of Technology, May 1971, Vol. 1, 173 pages, Vol. 2, 278 pages.

A. Owens, "General Surgeons, Too Many in the Wrong Places", *Medical Economics*, New York, 1970, Vol. 47, pages 128–133.

R.B. Phillips, "Analysis of a Rural Surgical Practice," *American Journal of Surgery*, 1968, Vol. 115, pages 795–798.

J.H. Strickler, "How Many Surgeons are Needed?" *Minnesota Medicine*, 1968, Vol. 51, page 331.

29. The search continues for a name or names for the types of health workers that we include in this general category. Physicians' Assistant, Family Practice Nurse, Nurse Clinician, Clinical Nurse Specialist, Nurse in an Expanded Role, are among the titles suggested. Without prejudice we adopt the title "Nurse Practitioner" for the purposes of this study, in the belief that it has the most general application, a feature particularly desirable at a time when we are not equipped to be more specific.

30, There were no maternal deaths recorded in 1966-1968 and the infant deaths were substantially reduced in this period.

31. D.C. Bews, "Effective Utilization of Nurses in Industry", *American Association of Industrial Nurses Journal*, October 1957, Vol. 5, Issue 10,

pages 23–28. See also page 140.

32. Joint Committee of the Society of Obstetricians and Gynaecologists of Canada and the Canadian Paediatrics Society, *Report on the Regionalization of Reproductive Care in Canada*, May 1971. (Draft as yet unpublished, cited with permission).

33. Since this was written the following report on the subject has been published: Department of National Health and Welfare, *Report of the Committee on Nurse Practitioners*, Chairman, Prof. T.J. Boudreau, Information Canada, Ottawa, April 1972, 52 pages.

34. C. Hanly, *Mental Health in Ontario*, A Study for the Committee of the Healing Arts, Queen's Printer, Toronto, 1970.

35. See Research List Nos. 158-181, Appendix 2 of the Supplementary Papers.

36. For example, a study under the auspices of the Ontario Council of Health, Faculties of Medicine, the Ontario Medical Association, the College of Family Physicians and the College of Physicians and Surgeons of Ontario reported in the *Annual Report of the College of Physicians and Surgeons*, Toronto, 1970.

37. Thomas J. Boudreau, *Future Needs for Health Manpower*, a paper delivered at the Second National Conference on Health Manpower, Proceedings published by the Department of National Health and Welfare, October 19, 1971. The paper contains the following statement on page 34: "In a study being presently conducted at the University of Sherbrooke by Professor Richard Beland for the Quebec Study Committee on Hospital Manpower, it has been possible, from the budget presentation of the hospitals of the province to identify four hundred and twenty (420) different occupations in the hospitals of the province."

38. Ibid., pages 32-34

39. Ibid., pages 37-38.

**V. Organization in the Health Field**

1. J.E.F. Hastings, *Major Issues for Decision and Action* from *Health Services in Canada*, A Report of a Working Conference on the Implications of a Health Charter for Canadians, Canadian Labour Congress, Ottawa, 1965, pages 40-51.

2. John R. Evans, *Coordination of Educational Program*, Second National Conference on Health Manpower, Department of National Health and Welfare and the Association of Universities and Colleges in Canada, Ottawa, October 21, 1971.

3. Statistics Canada, *Canada Year Book 1970-71*, Information Canada, Ottawa, 1971.

4. Commission of Inquiry on Health and Social Welfare, (Quebec), Committee on the Healing Arts (Ontario), Ontario Council of Health.

5. An address by the Honourable John Munro to the Annual Meeting of the Association of Canadian Medical Colleges in Edmonton, Alberta, October 1971.

6. The latest available figures (1968) reveal that there are 232 General Hospitals in Canada with less than 25 beds and 433 General Hospitals with less than 50 beds. Statistics Canada, *Canada Year Book 1970-71*, Informa-

tion Canada, Ottawa, 1971.

7. For examples see Appendix 8 of the Supplementary Papers.

8. See Chapter VII.

9. Some general principles that might be followed:
- General hospitals should have all the ordinary services.
- They should have special services where the case load and the calibre of the staff justifies it and where the back up facilities are normally present.
- Services requiring extra-expensive, specific equipment and to which patients can readily be transported should be concentrated (e.g., Radiotherapy).
- Trial services that require special equipment or staff should be confined to one hospital.

10. See page 103.

11. For example, 25 per cent on one day in Toronto. Metropolitan Toronto Hospital Planning Council, *Second Annual Report*, Toronto, 1968, page 11.

12. R.E. Bell, "Medical Laboratory Accreditation and Quality Control in Alberta: 1. Laboratory Accreditation", *Canadian Medical Association Journal*, November 21, 1970, Vol. 103, pages 1169 – 1174.

13. *Private Clinical Laboratories in Ontario*, Chemical Engineering Research Consultants Ltd., a Study for the Committee on the Healing Arts 1969, Queen's Printer, Toronto, 1969.

14. David B. Tonks, "A Study of the Accuracy and Precision of Clinical Chemistry Determinations in the 170 Canadian Laboratories", *Clinical Chemistry*, 1963, Vol. 9, No. 2, pages 217-233.

15. R.E. Bell, *op. cit.*

16. Committee on the Healing Arts, *op. cit.*, page 42.

17. R.E. Bell, "Medical Laboratory Accreditation and Quality Control in Alberta: II. Quality Control", *Canadian Medical Association Journal*, April 3, 1971, Vol. 104, pages 590 – 594.

18. Ontario Department of Health, *Report of the Ontario Council of Health on Health Care Delivery Systems*, Report on Regional Laboratory Services, Communications Branch, Toronto, 1969, Annex "H", Section II, page 145.

19. Ibid.

20. In 1967 solo practitioners accounted for 55 per cent of Canada's physicians, while 14 per cent were engaged in 2-man partnerships and 31 per cent were engaged in some form of combined or group practice. R.D. Fraser, *Selected Economic Aspects of the Health Care Sector in Ontario*, A Study for the Committee on the Healing Arts, Queen's Printer Toronto, 1970, Table A24, page 249.

21. There are a number of clinics (approximately 450 reported in 1967, Canadian Medical Association Committee Report, *Group Practice in Canada*, Ryerson Press, Toronto) of different sizes and types. Some are composed of Family Practitioners only, others a mixture of Family Practitioners and Specialists, most are situated in cities and are relatively small. There are, however, some large ones; at the most recent available count (1967) there were 20 groups comprising 10 or more physicians, and these serve a large number of patients (one clinic that we visited in the West, maintains

active files on 400 000 patients).

22. With an important "lay" representation, a distinguishing feature.

23. Some examples of areas where studies have been made: The Sherbrooke region of Quebec (see page 102), the medically underserviced areas in Ontario (see page 72), the "regions" in the World Health Organization Study (see Appendix 11 in the Supplementary Papers); the Alberta, Montreal and Toronto studies (Appendix 11).

24. *Portfolio for Health, The Role and Programme of the Department of Health and Social Security in Health Services Research*, Published for the Nuffield Provincial Hospital Trust by the Oxford University Press, Toronto, 1971.

25. R.M. Anderson, Personal communication.

26. G. Gingras, "Rehabilitation Medicine, 1970" *Annals of Royal College of Physicians and Surgeons of Canada*, Ottawa, April 1971, pages 115-122.

27. Ontario Department of Health, *op. cit.*, Supplement 6, pages 17-18.

28. See Appendix 10 of Supplementary Papers.

29. E.V. Wahn, *Comprehensive Health Care Planning: The Role of the Teaching Hospital*, A paper presented at the October 1969 Meeting of the Association of Canadian Teaching Hospitals, Toronto 1969, 15 pages.

30. Thomas J. Boudreau, *The Regionalization of Health Services. The Eastern Townships Experience*, Paper Presented at the Annual Meeting of the Canadian Public Health Association, Winnipeg, May 20, 1970, 40 pages.

31. *Ibid.*

32. Ontario Department of Health, *Report of the Ontario Council of Health on Regional Organization of Health Services*, Toronto, 1970, Supplement No. 1, 31 pages.

33. Nova Scotia Department of Health, *A Report on an Integrated System of Hospital Facilities and Related Services*, Chairmen, G.B. Rosenfield and G. Graham Simms, 1971, 93 pages.

34. Metropolitan Toronto Hospital Planning Council, *Fourth Annual Report 1970*, Chairman, H. Hoyle Campbell, Toronto, 1970, 31 pages.

35. Joint Committee of the Society of Obstetricians and Gynaecologists of Canada and the Canadian Paediatrics Society, *Report on the Regionalization of Reproductive Care in Canada*, Vancouver, May 1971 (Draft as yet unpublished, cited with permission).

36. "If the mortality rate in Canada were the same as that expected in obstetrical-neonatal teaching hospitals, there would probably be 2000 fewer neonatal deaths every year." *Ibid.*

**VI. Cost and Management**

1. Economic Council of Canada, Seventh Annual Review, *Patterns of Growth*, Information Canada, Ottawa, 1970, 109 pages. This is not surprising. The increase is actually less than that anticipated by the *Royal Commission on Health Services Report*, Chairman, Chief Justice Emmett M. Hall, Queen's Printer, Ottawa, 1964, Vol. 1, page 795. In its report the projected portion of GNP to be devoted to health services in 1966 was 5.46 per cent to 5.66 per cent (depending on the rate of growth of GNP).

2. The four principle components of personal health care are:
1) Hospital services: including public and private general hospitals, Maternity Hospitals, and Hospitals for Chronic Diseases and Convalescence: excluded are psychiatric institutions, tubercular sanitoria, and all hospitals of the Government of Canada. These figures represent the operating expenses of these hospitals excluding capital costs, but including depreciation charged.
2) Physicians services: The figures quoted also represent fees earned by physicians in private practice.
3) Dentists services: These figures also represent earnings of dentists from private practice.
4) Drugs: The estimates for drug expenditures are based on the estimated retail prescription sales in retail pharmacies in Canada.

3. Ralph D. Baker, "A Bird in a Badminton Cage", *Canadian Hospital*, Toronto, June 1970 ,Vol. 47, No. 6.

4. Task Force Reports on the Cost of Health Services in Canada, Hospital Services: *Utilization; Operational Efficiency; Salaries and Wages; Beds and Facilities*, Department of National Health and Welfare, Ottawa, 1970, Vol. 2, page 65.

5. Results of internal survey of Management Consultants, carried out by the Health Science Study Group, 1971, with the assistance of Douglas Nesbitt.

6. See Appendix 8 in Supplementary Papers.

**VII. Computers in Health Care**

1. Personal communication from Ontario Hospital Services Commission.

2. Morton D. Schwartz, *Computer Systems in Medicine*, Paper Presented at 1971 Institute of Electrical and Electronics Engineers Inc. (IEEE), with Operations Research Society of America, (ORSA), Systems Management and Cybernetics Group, Anaheim, California, October 25 – 27, 1971, 6 pages.

3. R.A. Denison, *A Bibliography of Operational Research in Hospitals and the Health Services*, University Microfilms Ltd., Ann Arbor, Michigan, 1970.

4. Hospital Systems Study Group Annual Report, 1970, University of Saskatchewan, Saskatoon, 1970, 33 pages.

5. See for example, Gordon H. Robinson, P. Wing, L. Davis "Computer Simulation of Hospital Patient Scheduling Systems", *Health Services Research*, Chicago, Summer 1968, pages 130-141.

6. Shlome Barnoon, and Harvey Wolfe, "Scheduling a Multiple Operating Room System: A Simulation Approach", *Health Services Research*, Chicago, Winter 1968, pages 272-285.

7. George H. Milly, and Leon S. Pocink, *A Computer Simulation Model for Evaluation of the Health Care Delivery System*, National Center for Health Services Research and Development, U.S.A., Department of Health Education and Welfare, June 1970, 89 pages.

8. John H. Milsum, *et al.*, *Health System Ecology: An Interactive Model*, Presented at the 40th Joint National Conference on Major Systems, Operations Research Society of America and the Institute of Electrical and Electronics Engineers, Inc., Anaheim, California, October 1971, 7 pages.

9. S. Fanshel, and J.W. Bush, "Health Status Index and Its Application to Health Services Outcomes", *Journal Operations Research Society of America*, November-December 1970, Vol. 18, No. 6, pages 1021–1066

10. Hari Anand, "A Computer-Based Hospital Information System", *Hospital Administration in Canada*, September 1971.

11. James A. Terrano, *Medical Information System Feasibility Study*, Electronic Data Processing and Hospital Services Division/Minnesota Hospital Service Association, Minnesota, December 1970.

12. D. Shepley "A Patient Oriented Information System and Environment – POISE", *Canadian Datasystems*, May 1970, pages 50–52.

13. See Appendix 2, Nos. 418, 350 and 210 in Supplementary Papers.

14. Morton D. Schwartz, *op. cit.*

15. *Private Clinical Laboratories in Ontario*, A Study for the Committee on the Healing Arts, Queen's Printer, Toronto, 1969.

16. K. Brodman, A. Erdmann, I. Lorge, H. Wolff, "Cornell Medical Index, An Adjunct to Medical Interview", *Journal of American Medical Association*, June 11, 1949, Vol. 140, pages 530–534.

17. See Appendix 2, Nos. 242, 399 and 525 in Supplementary Papers.

18. Irving F. Kanner, "Programmed Medical History-Taking With or Without Computer", *Journal of American Medical Association*, January 13, 1969, Vol. 207, No. 2, pages 317–321.

19. Private communication from Canadian Medical Association.

20. M.F. Collen, "Periodic Health Examination Using an Automated Multitest Laboratory", *Journal of American Medical Association*, March 7, 1966, Vol. 195, pages 142–145.

21. H.L. Dunn, "Record Linkage", *American Journal of Public Health and the Nation's Health*, December 1946, Vol. 36, pages 1412–1416.

22. Gordon McLachlan, Editor, *Portfolio for Health, The Role and Programme of the Department of Health and Social Security In Health Services Research*, Oxford University Press for Nuffield Provincial Hospital Trust, London, England, 1971, 300 pages.

23. Howard B. Newcombe, "Risks to Siblings of Stillborn Children", *Canadian Medical Association Journal*, January 27, 1968, Vol. 98, pages 189–193.

24. Canada, Medical Research Council, Report No. 3, *Health Research Uses of Record Linkage in Canada*, Queens' Printer, Ottawa, 1968.

25. Ontario Department of Health, Report of the Ontario Council of Health, on Health Care Delivery Systems, *Role of the Computers in the Health Field*, 1970, Supplement No. 9, 177 pages. See also Donald A.B. Lindberg in Bibliography of Report.

26. Joseph F. Terdiman, "Mass Random Storage Devices and Their Application to a Medical Information System (MIS)", *Computers and Biomedical Research*, 1970, Vol. 3, pages 528–538. See also E.E. Van Brunt, in Appendix 2, No. 414, in the Supplementary Papers.

27. Sixten Abrahamsson, S. Bergstrom, K. Larsson, S. Tillman, "Danderyd Hospital Computer System II, Total Regional System for Medicare", *Computers and Biomedical Research*, New York, February, 1970, Vol. 3, pages 30-46.

28. "Hospitals in Sweden", *Modern Hospital*, October 1971, pages 105-116.

29. Donald A.B. Lindberg, "A Statewide Medical Information System, *Computers and Biomedical Research*, New York, 1970, Vol. 3, pages 453-463.

30. Ontario Department of Health, *op. cit.*

31. See Appendix 2, Nos. 291 and 332 in Supplementary Papers.

32. Thomas Taylor, "Computers in Medicine", *Science Journal*, October 1970, pages 81-86.

33. A Journal published by this organization has the following address: Arithmed Verlags, A.G., CH-8001, Ramistrasse 7, Zurich, Switzerland.

**VIII. Prevention and Promotion**

1. Obtained from Statistics Canada and the Traffic Injury Research Foundation.

2. This means that the equivalent of five large hospitals (averaging 550 beds each) are constantly filled with people injured in road accidents.

3. V.R. Fuchs, *Medical Economics*, February 5, 1968.

4. We have noted four research projects currently in progress (Appendix 2 in the Supplementary Papers, Research Lists 193, 194, 197, 201) in which evaluation of the effectiveness of educational programs is being carried out.

5. D.L. Sackett, "Can Screening Programs for Serious Diseases Really Improve Health?" *Science Forum*, June 1970, Vol. 3, No. 3, pages 9-13.

6. See Appendix 2, Research List Nos. 779-824.

7. Draft Report of the Joint Committee of the Society of Obstetricians and Gynaecologists of Canada and the Canadian Paediatrics Society on the Regionalization of Reproductive Care in Canada, unpublished, cited with permission.

8. 1) "Air Pollution and Health", Summary and Report on Air Pollution and its effects on Health, by the Committee of the Royal College of Physicians of London on Smoking and Atmospheric Pollution, *Pitman Medical*, London, 1970.
2) David Bates, "Air Pollution and the Human Being", *American Review of Respiratory Disease*, 1972, Vol. 105, pages 1-13.

9. Personal communication from Dr. D.C. Bews, Medical Director, Bell Canada, who supplied Figures 4 and 5.

10. In recent years the visits have been weighted according to the time spent and this reveals a considerably greater preponderance of "Promotional" effort.

**IX. Research in Health Care in Canada**

1. This, we felt, was, in the context of our study, a more natural and useful division than that called for in the Frascati manual in which Basic Research (work undertaken primarily for the advancement of knowledge without specific application in view); Applied Research (work with a specific application in view; and Development, are separated. The application of the Frascati Formula does not throw into focus what we consider to be the

key issues. If our premise, that the most urgent problems facing us currently are in the health care and social fields, is correct, it is clearly important to view these separately.

2. The funds to MRC for the support of Medical Research generally have risen from $270 000 in 1947–48 to $34 000 000 in 1970–71. In 1970–71 approximately one quarter of the money was used for personnel support (Scholarships, Associateships, pre- and postdoctoral training), Medical Research Council of Canada, Report No. 2, *Canadian Medical Research: Survey and Outlook*, Ottawa, 1970 and *Report of the President 1970–71*, Ottawa, 1971.

3. During much of the period of this study the Commission to study the Rationalization of University Research has been at work.

4. It is interesting to note that the first of these was established in 1967.

5. Robin F. Badgley, Editor, "Social Science and Health in Canada," Toronto, 3rd and 4th June 1969, Proceedings published in the *Milbank Memorial Fund Quarterly*, April 1971, Vol. XLIX, No. 2, Part I, 320 pages.

# Appendices

## Contents of the Supplementary Papers

In a separate volume are set forth many of the data to which many references have been made in the text of the study.

The contents of *Health Care in Canada: Supplementary Papers* are as follows:

**Appendix 1,** Index to the List of Health Care Research Projects. (Arranged in categories.)

**Appendix 2.** Health Care Research Projects in Progress September 1970 to September 1971. This contains all those judged to fall within the sphere of concern of this study.

**Appendix 3.** "Principal Investigator Reference for Appendix 2."

**Appendix 4.** "University and Place Reference for Appendix 2."

**Appendix 5.** "Sources Consulted in Compiling Appendix 2."

**Appendix 6.** "Computers in Canadian Health Care." A summary of the state of computer applications in Canadian Hospitals.

**Appendix 7.** Information on "Canadian Medical Schools and the School of Hygiene, University of Toronto." A summary of some of the newer activities in Health Care Teaching and Research Development.

**Appendix 8.** "Formal Health Planning Organizations."

**Appendix 9.** "McMaster University Nurse Practitioner Program."

**Appendix 10.** "Recommendations Made in Previous Reports."

Some recommendations made by:

Royal Commission on Health Services.
Ontario Council of Health.
Task Force on Cost of Health Services in Canada.
National Health Manpower Conferences.
Commission of Inquiry on Health and Social Welfare.
Committee on the Healing Arts.
Public Health Practices Committee.
Medical Research Committee. (Report No. 2)

On the Subjects:

Comprehensive Health Scheme.
Quality of Health Care.
Organization of Health Services.
Education of Health Workers.
Computers in the Health Field.
Research in Health Care Delivery.

**Appendix 11.** "Results of Canadian Surveys." A tabulation of some of the results of the following surveys of "Consumer of Health Care" in Canada and elsewhere:

Alberta Health Care Study.
Montreal Household Study.
Toronto Household Study.
World Health Organizational Collaborative Study of Medical Care Utilization (B.C., Alberta and Saskatchewan and elsewhere).

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**Third Annual Report,** *1968-69* (SS1-1969)
**Fourth Annual Report,** *1969-70* (SS1-1970)
**Fifth Annual Report,** *1970-71* (SS1-1971)
**Sixth Annual Report,** *1971-72* (SS1-1972)
**Seventh Annual Report,** *1972-73* (SS1-1973)

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*Report No. 9,* **This Land is Their Land...** (SS22-1970/9, $0.75)
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*Report No. 11,* **A Canadian STOL Air Transport System – A Major Program** (SS22-1970/11, $0.75)
*Report No. 12,* **Two Blades of Grass: The Challenge Facing Agriculture** (SS22-1970/12, $0.75)
*Report No. 13,* **A Trans-Canada Computer Communications Network: Phase I of a Major Program on Computers** (SS22-1971/13, $0.75)
*Report No. 14,* **Cities for Tomorrow: Some Applications of Science and Technology to Urban Development** (SS22-1971/14, $0.75)
*Report No. 15,* **Innovation in a Cold Climate: The Dilemma of Canadian Manufacturing** (SS22-1971/15, $0.75)
*Report No. 16,* **It Is Not Too Late – Yet: A look at some pollution problems in Canada...** (SS22-1972/16, $1.00)
*Report No. 17,* **Lifelines: Some Policies for Basic Biology in Canada** (SS22-1972/17, $1.00)
*Report No. 18,* **Policy Objectives for Basic Research in Canada** (SS22-1972/18, $1.00)
*Report No. 19,* **Natural Resource Policy Issues in Canada** (SS22-1973/19, $1.25)

*Report No. 20*, **Canada, Science and International Affairs** (SS22-1973/20, $1.25)

*Report No. 21*, **Strategies of Development for the Canadian Computer Industry** (SS22-1973/21, $1.50)

## Special Studies

*Special Study No. 1*, **Upper Atmosphere and Space Programs in Canada,** by J.H. Chapman, P.A. Forsyth, P.A. Lapp, G.N. Patterson (SS21-1/1, $2.50)

*Special Study No. 2*, **Physics in Canada: Survey and Outlook,** by a Study Group of the Canadian Association of Physicists, headed by D.C. Rose (SS21-1/2, $2.50)

*Special Study No. 3*, **Psychology in Canada,** by M.H. Appley and Jean Rickwood, Canadian Psychological Association (SS21-1/3, $2.50)

*Special Study No. 4*, **The Proposal for an Intense Neutron Generator: Scientific and Economic Evaluation,** by a Committee of the Science Council of Canada (SS21-1/4, $2.00)

*Special Study No. 5*, **Water Resources Research in Canada,** by J.P. Bruce and D.E.L. Maasland (SS21-1/5, $2.50)

*Special Study No. 6*, **Background Studies in Science Policy: Projections of R & D Manpower and Expenditure,** by R.W. Jackson, D.W. Henderson and B. Leung (SS21-1/6, $1.25)

*Special Study No. 7*, **The Role of the Federal Government in Support of Research in Canadian Universities,** by John B. Macdonald, L.P. Dugal, J.S. Dupré, J.B. Marshall, J.G. Parr, E. Sirluck, E. Vogt (SS21-1/7, $3.00)

*Special Study No. 8*, **Scientific and Technical Information in Canada,**
*Part I*, by J.P.I. Tyas (SS21-1/8, $1.00)
*Part II, Chapter 1*, Government Departments and Agencies (SS21-1/8-2-1, $1.75)
*Part II, Chapter 2*, Industry (SS21-1/8-2-2, $1.25)
*Part II, Chapter 3*, Universities (SS21-1/8-2-3, $1.75)
*Part II, Chapter 4*, International Organizations and Foreign Countries (SS21-1/8-2-4, $1.00)
*Part II, Chapter 5*, Techniques and Sources (SS21-1/8-2-5, $1.25)
*Part II, Chapter 6*, Libraries (SS21-1/8-2-6, $1.00)
*Part II, Chapter 7*, Economics (SS21-1/8-2-7, $1.00)

*Special Study No. 9*, **Chemistry and Chemical Engineering: A Survey of Research and Development in Canada,** by a Study Group of the Chemical Institute of Canada (SS21-1/9, $2.50)

*Special Study No. 10*, **Agricultural Science in Canada,** by B.N. Smallman, D.A. Chant, D.M. Connor, J.C. Gilson, A.E. Hannah, D.N. Huntley, E. Mercier, M. Shaw (SS21-1/10, $2.00)

*Special Study No. 11*, **Background to Invention,** by Andrew H. Wilson (SS21-1/11, $1.50)

*Special Study No. 12*, **Aeronautics – Highway to the Future,** by J.J. Green (SS21-1/12, $2.50)

*Special Study No. 13*, **Earth Sciences Serving the Nation,** by Roger A. Blais, Charles H. Smith, J.E. Blanchard, J.T. Cawley, D.R. Derry, Y.O. Fortier, G.G.L. Henderson, J.R. Mackay, J.S. Scott, H.O. Seigel, R.B. Toombs, H.D.B. Wilson (SS21-1/13, $4.50)

*Special Study No. 14*, **Forest Resources Research in Canada,** by J. Harry G. Smith and Gilles Lessard (SS21-1/14, $3.50)

*Special Study No. 15*, **Scientific Activities in Fisheries and Wildlife Resources,** by D.H. Pimlott, C.J. Kerswill and J.R. Bider (SS21-1/15, $3.50)

*Special Study No. 16*, **Ad Mare: Canada Looks to the Sea,** by R.W. Stewart and L.M. Dickie (SS21-1/16, $2.50)

*Special Study No. 17*, **A Survey of Canadian Activity in Transportation R & D,** by C.B. Lewis (SS21-1/17, $0.75)

*Special Study No. 18*, **From Formalin to Fortran: Basic Biology in Canada,** by P.A. Larkin and W.J.D. Stephen (SS21-1/18, $2.50)

*Special Study No. 19*, **Research Councils in the Provinces: A Canadian Resource,** by Andrew H. Wilson (SS21-1/19, $1.50)

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