Evaluating Medical Technology in the Context of a Fiscal Crisis: The Case of New Zealand

JOHN B. McKINLAY

Department of Sociology,
Boston University, and
Massachusetts General Hospital

NEW ZEALANDERS ARE TAUGHT, AND SOME EVEN believe, that theirs is "God's Own Country." Perhaps its geographical isolation and a generally favorable climate, combined with the equable disposition of its people, support this view. Ever so slowly, and painfully, New Zealanders are realizing that this is not now (if indeed it ever was) the case. Informed advice warns that the country is in dire economic circumstances. Some appreciation of these circumstances is essential if there is to be any understanding of the present state and future direction of the country's system of human services. Health care planners too often cannot, or will not, see that macroeconomic factors have just about everything to do with informed social policies concerning the public health. Indeed, they determine the very nature and range of policy options available for government. Such a truistic but necessary observation is the point of departure for the ensuing discussion.

This paper considers some problems and aspects of social policy concerning high technology as applied to medical care in New Zealand. The first section reviews several structural problems besetting the country's economy. These problems determine what is possible for future social policy, especially that concerning the proliferation of high technology. The second section describes the overall medical care system, highlighting three issues that are affected by, and them-

Milbank Memorial Fund Quarterly/*Health and Society*, Vol. 58, No. 2, 1980

0160-1997-80-5802-0217-51/$01.00/0

selves compound, problems associated with high technology as applied to medicine. Unless social policy also addresses these seemingly separate, but closely related issues, no realistic social policy concerning high technology in medicine is possible. After this necessary background, the third section examines some aspects of medical technology, with specific examples, and offers suggestions for social policies in this area, in the context of New Zealand's overall economic situation.

The Serious Condition of the Economy

New Zealand is a small country covering an area of only 103,736 square miles and comprising three main islands—the North Island, the South Island, and the considerably smaller Stewart Island to the south—as well as a number of minor islands. The main islands are mountainous with rich coastal plains. The country is isolated from the rest of the world. Even Australia, of which it is sometimes thought to be an offshore island, is some 1200 miles away. In 1976, New Zealand had a population of 3,129,000; 2,700,000 (86 percent) of these were of European origin; 61,000 (2 percent) were Polynesian, and the remainder of other races (mainly Chinese and Indian).[1]

Recent *external* developments in international finance, over which New Zealand has little control, have exposed pre-existing structural weaknesses in the political economy, and heightened the country's economic vulnerability (United States Foreign Economic Policy Subcommittee, 1977; McKinlay, 1978a). Two such areas of vulnerability will be considered here as illustrations. First, the country's exports are commonly divided into two main categories: "primary" or agricultural

[1] Many of the statistics in this report derive from the New Zealand Planning Council's (1978) *Planning Perspectives: 1978–83*. My heavy reliance on this useful publication is hereby acknowledged. It was selected because 1) the Planning Council is probably the most authoritative source of economic information now available in New Zealand; 2) the material it uses is more or less up-to-date; and 3) as an appointed agency of the government, it tends to err on the side of caution and optimism. If, as the Planning Council suggests, the country is in dire economic straits, then it is indeed likely to be in such condition.

activities (mainly meat, wool, and dairy products), and "secondary" or industrial products (forest products and small-scale manufacturing exports). A disproportionate three-quarters of New Zealand's exports involve primary (traditional) products—a proportion that has changed negligibly over the last several decades—so that the economy is extremely vulnerable to overseas protectionism and world-wide price fluctuations. Nationwide alarm was expressed during 1978 when a television program simulated the economic decimation that would result from the introduction of a single disease that afflicts sheep.

A second example of New Zealand's vulnerability to external developments relates to oil: some 87 percent of requirements are imported. During the decade before 1973 (the year in which the OPEC cartel quadrupled oil prices), oil imports were equivalent in value to an average of about 5 to 6 percent of export receipts. By 1975, this figure had risen to about 21 percent. Government action to reduce volume brought the percentage down to 15.4 in 1977, but is unlikely to keep it there because of the heavy reliance of transport on liquid fuels (about 71.5 percent of total oil consumption) and oil price increases already scheduled by OPEC. Vulnerability through oil is a problem New Zealand shares with most other countries. When combined with vulnerabilities in other areas, however (e.g., remoteness, the high cost of overseas trade, a disproportionately heavy agricultural base, etc.), New Zealand appears precariously situated in the international financial area.

The recent precipitate decline in the terms of trade (the ratio of export prices to import prices), caused mainly by rising import prices, is further cause for concern. New Zealand's terms of trade, in contrast to the trend in previous postwar cycles of economic activity, improved little when other industrial countries moved out of the 1974–1975 recession, and has actually deteriorated further. In 1978 New Zealand had an unprecedentedly high deficit, over and above its already heavy borrowing, of $1446 million.* The range of actions that have been necessary to cope with (not solve) *external* developments (e.g., pricing policies, the dampening of demand, and taxation increases) have obviously had *internal* repercussions. For example, over the period

*Throughout this paper, figures in dollars refer to New Zealand dollars.

1973–1976, the growth of the volume of goods and services produced, the real gross domestic product (GDP), fell behind population growth. As the terms of trade deteriorated, New Zealand could purchase fewer imports for the value it earned through exports. After adjustment for the effect of both the deterioration in terms of trade (−12 percent) and the increase in population from 1973 to 1976 (5 percent), real income per capita fell by 14.4 percent over these four years. New Zealand's rate of inflation, although it usually follows the world rate, has recently lagged behind that of its trading partners, thereby further handicapping exporters and local industries, which must compete with cheaper overseas imports.

The resulting problem of unemployment is particularly hard on semiskilled and unskilled workers, new school leavers, the less-well-educated, and particular population groups such as Maoris and other Polynesians—those perhaps most in need of an opportunity to work. The number registered as unemployed continues to rise despite government provision of special work, the disincentive to register as unemployed because of the stigma of unemployment, and a net outflow during 1977 and 1978 of about 70,000 people.

This population loss is of particular concern, since many of these migrants are young skilled or professional workers, who leave New Zealand in search of more favorable employment opportunities. Nearly one-half of the emigrants between 1971 and 1978 were between ages 20 and 29; one-quarter were teachers, engineers, and other professional or technical workers, and nearly one-third were craftsmen or production workers, including machinists, electricians, and carpenters. The departure of workers in these categories, and in such large numbers, represents the loss of a resource for which the country will have even greater need in the future, if it is ever fully to recover from its present economic malaise.

Related demographic developments have tended to compound these difficulties. Of significance are the sharp decline in fertility rates, the immigration of Pacific Islanders (many of whom require considerable support through human services), and continuing internal migration from rural to urban areas, particularly of Maoris. The general fertility rate (the number of live births per 1,000 women aged between 15 and 44 years) has declined from a peak of 140.6 in 1961 to

83.2 in 1976. This decline, which is also occurring among the Maori population (who until recently experienced relatively high fertility rates) is of course being reflected in the changing age structure of the population. The elderly, as a proportion of the total population, continue to increase, and will require some expansion of the services concerned with their support in the community.

Attempts over the last several decades to broaden the country's economic base, through the expansion and diversification of manufacturing activities, have produced marked changes in the composition of exports and imports, and have altered traditional trading relations, but have not markedly lessened the country's economic vulnerability. New Zealand has few options in terms of natural resources, which consist primarily of some low-grade coal deposits and a little natural gas. To expand secondary industry, therefore, requires the importation of raw materials, which creates a new form of dependence on international trade. One authoritative report describes a new aspect of the country's economic vulnerability as follows:

> In colonial times, New Zealand's purpose was to supply agricultural commodities to Britain, and the nation's development was governed by fluctuations in world commodity prices. It is an ironic twist of fate that our efforts to insulate the economy through the development of manufacturing have in one sense widened the area of dependency and vulnerability, through dependence on imported raw materials and other inputs, to our industries. (New Zealand Planning Council, 1978)

Government maneuverability with respect to the public funding of services is restricted by the New Zealand taxation structure, which has been described by the Planning Council as "unattractive from a viewpoint of economic growth and also on the grounds of equity" (New Zealand Planning Council, 1978). Since it limits the range of options open to the state, particularly future public expenditure for human services, this tax structure and some of its consequences should be briefly described. New Zealand is distinctive in the proportion of total tax revenue raised in the form of personal and company income taxes. The proportion of total income taxes paid by private individuals in relation to that paid by companies has been growing: in 1959–1960

the ratio of personal to corporate income tax was 71:29, whereas in 1976–1977 it had risen to around 82:18. In 1966–1967, the average tax rate for a married person on an average wage was 11.8 percent: by 1977–1978, this rate had doubled to 23.2 percent. The tax rate on an additional dollar of income (the marginal tax rate) earned by a married person on the average wage in 1966–1967 was 22.5 percent: by 1977–1978 it was 45.5 percent. Although notoriously difficult to determine, the effective tax rate on company profits is authoritatively estimated to be as high as 78 percent. Some have suggested that the total income tax levied on the profits of many companies exceeds 100 percent of their real profits. Such high rates have a profound effect on, among other things, the incentive to work, save, and invest, and probably contribute to the current net outflow of New Zealanders to other countries. With regard to social equity, the current situation has been summarized as follows:

> While the tax structure is superficially very progressive (aimed to ensure that high-income earners pay not only absolutely but also proportionately more tax than low income earners) the actual situation is probably quite different, with a progressive tax structure applying to a wide band of wage and salary earners, but substantial scope for tax avoidance available to the highest income earners and little or no tax payable by those who have substantial wealth invested in a non-income generating form. (New Zealand Planning Council, 1978)

In summary, New Zealand can be described as a geographically isolated country of small numbers with an economy that is unusually vulnerable to setbacks on the international financial scene. It is now beset with serious structural payments imbalances (exacerbated by but not wholly attributable to the recent actions of the OPEC cartel), requires heavy overseas borrowing to sustain its present standard of living, is experiencing a deterioration in the terms of trade, and is being forced to cast around for new trading partnerships. The country is beset with labor disputes (which have not been discussed here), a precipitate rise in unemployment, a crippling tax structure, the ill-afforded loss of thousands of its younger, more skilled workers, along

with other unfavorable demographic shifts. According to the New Zealand Planning Council (1978), the country, over the period 1978–1983, will be confronted with at least the following:

- A deficit between overseas receipts and payments.
- Negative economic growth and falling real income per head.
- Unemployment higher than at any time since the Depression.
- A continuing stream of New Zealanders leaving for other countries.
- Continuing high inflation.
- Tensions in industrial and social relationships.
- A slackening in the momentum of the drive for higher exports and for improved productivity in all sectors of the economy.

For those involved in health service research and planning in New Zealand, a difficulty is to persuade various interest groups (e.g., hospitals, the public, the professions) that these macroeconomic conditions will largely determine the future of the country's system of human services. The future of New Zealand's health system is often discussed as if the economic problems described do not exist, are only temporary, or can be rendered insignificant through "fine tuning." What is not now but must be recognized is that some appreciation of the country's economic condition is essential if social policy is to realistically confront and correct the structural problems besetting New Zealand medical care. Indeed, confrontation of these economic difficulties will determine whatever options are available for the future. Many of the problems associated with New Zealand's medical care system reflect, or are the consequences of, problems associated with the overall economy. In essence, whatever shape New Zealand's medical and health care system will assume in the future is dependent upon some recognition and solution of these problems in the overall economy. Visionaries do provide temporary relief from pressing realities, and sometimes foster useful alternative strategies. Eventually, however, one must return to the basic question for social policy (McKinlay, 1979a): What resources are likely to be available, and how can they be allocated so as to ensure value for money?

The Medical Care System

No real purpose would be served here by a detailed review of the history and organizational structure of New Zealand's medical care system, since the information is readily available elsewhere (New Zealand Government Printer, 1974, 1979). Instead, only the general contours of the system will be described before an exploration of three issues that bear upon the problem of high technology as applied to medical care, which is considered in the final section.

The Poor Return on Investment

What proportion of New Zealand's resources are consumed by medical care and what return does this investment yield? The pertinence of this social policy question is heightened by the preceding discussion of the country's economic plight. Figure 1 summarizes the changing distribution of central government expenditure since 1938. Over the last forty years, expenditure on human services (health and hospital boards and other social services and welfare benefits) has increased dramatically, from about one-third of all expenditure in 1938, to about one-half in 1978. For the fiscal year 1977–1978, $822 million was voted to health, a further $65 million to the Hospital Works Program (loan financed), $71 million to the Accident Compensation Commission, and $62 million to invalids and for sickness benefits and rehabilitation. In other words, in 1978 the total health-related expenditures by the public sector exceeded $1 billion, or 7 percent of the GNP.

Figure 2 gives some indication of the relative increase in both public and private expenditure on medical care over the period 1925–1978. Although government contributions have increased considerably over the entire period, the proportion of private contributions has changed little since the early 1940s. The way in which the government has allocated resources to three areas of health care since 1924 is depicted in Fig. 3. Hospital services have consumed the vast majority of the available resources, while public health activities have remained relatively constant. Community health care gained some ground at the

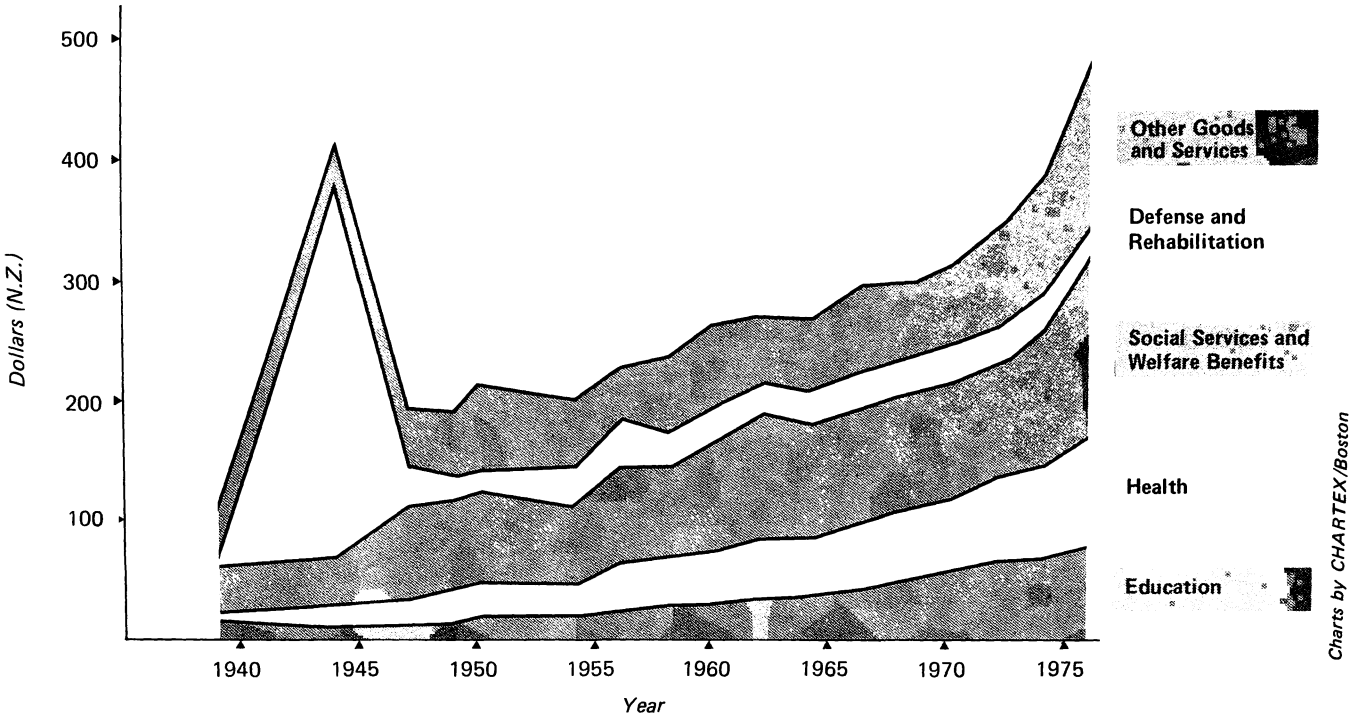

FIG. 1. Central government expenditures per capita at constant prices, 1939–1976. A wholesale price/gross domestic product index has been used as the deflator. Base year, 1965–1966.

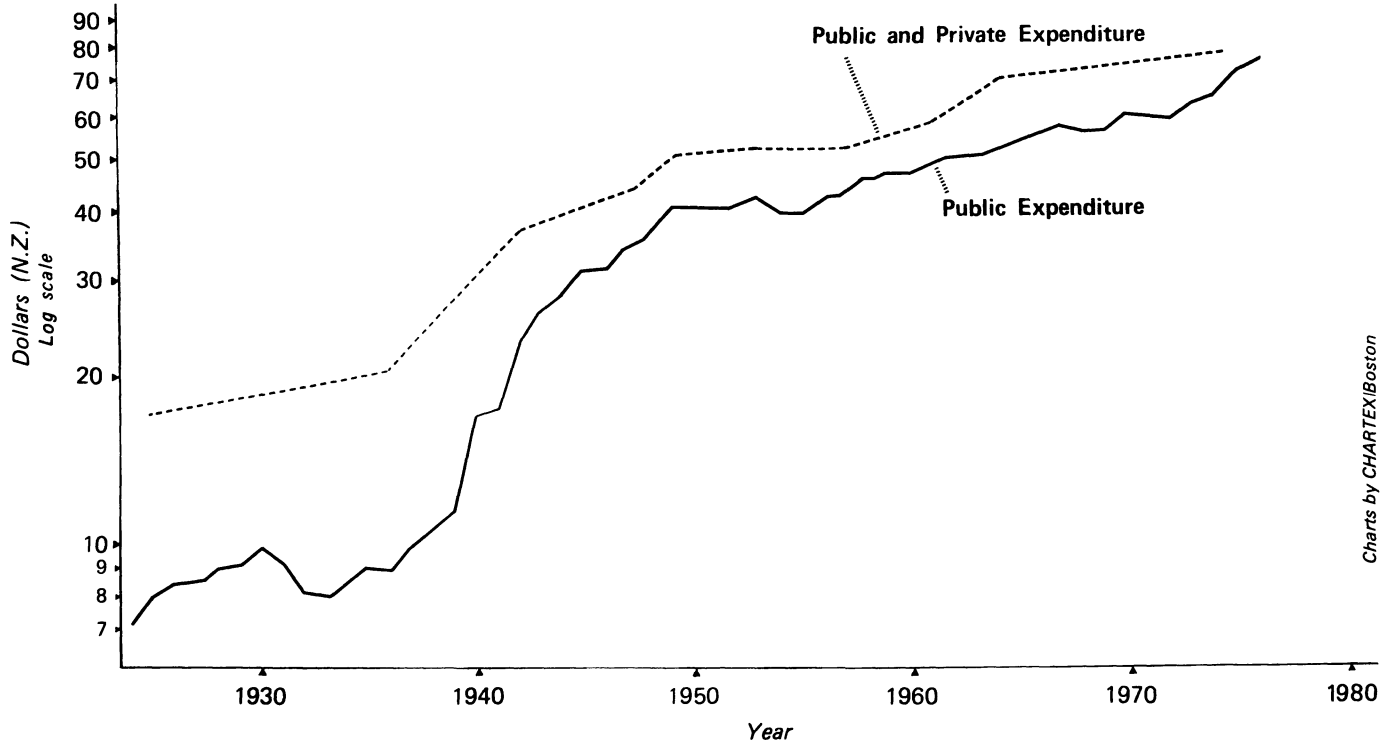

FIG. 2. Public (central government) and private expenditures on health per capita at constant prices, 1924–1978. The wage-rate index has been used as the deflator. Base year, 1965–1966. The estimates of private expenditure are tentative, particularly for the earlier years, and have been calculated on a conservative basis.

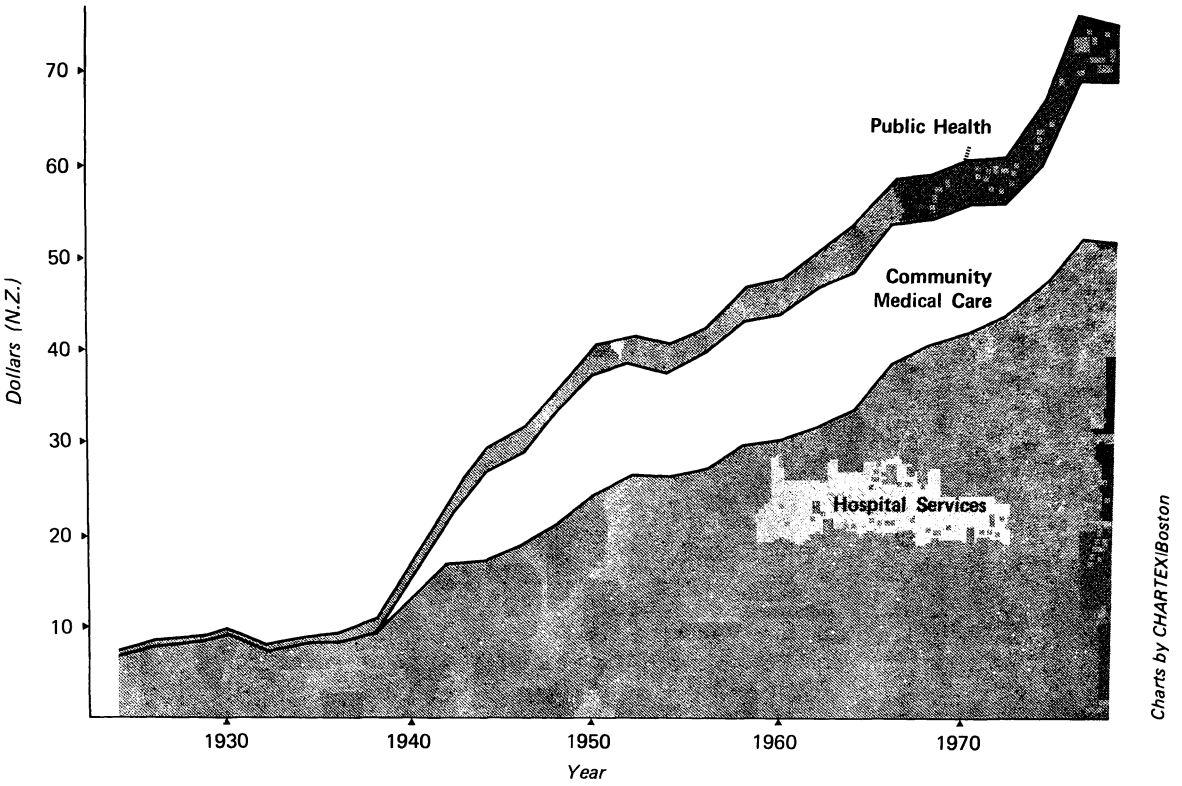

FIG. 3. Public (central government) expenditure on health per capita at constant prices, 1924–1977. The wage-rate index has been used as the deflator. Base year, 1965–1966.

expense of hospital services during the 1940s, but has slowly lost ground over the intervening years.

Fostered in part by public debate over a 1974 White Paper (*A Health Service for New Zealand*), by knowledge of the changing nature of medical problems, and by the concern among some medical students, an interest in activities related to community health has emerged over the last few years (New Zealand Government Printer, 1974). At present, less than 3 percent of total government expenditure on health is devoted to such activities. Since there are now no extra funds for new programs (in large part because of the volume of existing commitments to hospitals and the potential opposition of a powerful hospital lobby), the government has responded by raising funds through the imposition of an added tax on alcohol and tobacco (known in New Zealand as the "beer and baccy" tax). Although some have heralded the new tax as an innovative approach to the funding of community health services, several factors make this view unacceptable. First, this new tax has not resulted in any change in the overall pattern of resource allocation to health care in the country. It simply provides some short-term funds that are added onto the much larger resources already flowing into traditional areas of medical care. It displaces nothing, and may even reinforce the traditional allocation format. Second, most of the funds generated through this added tax do not go to community health per se, but to hospital boards, either for administrative activities, or for previously unfunded hospital-based proposals that were resurrected and resubmitted. Third, it must be considered paradoxical and against sound principles of budgeting that community health activities should be funded, in large part, by a tax on the consumption of tobacco and alcohol. The implication here is that the more the public spends on alcohol and tobacco products, which are known to place people at risk to certain largely preventable illnesses, the more there will be available for community health activities, a large proportion of which are devoted to the alteration of these very same at risk behaviors!

Given the country's economic plight, it is timely to inquire as to what return such investment yields, in terms of, say, standard measures of the nation's overall health status. Figure 4 contrasts the decline in the standardized death rate with the proportion of the GNP

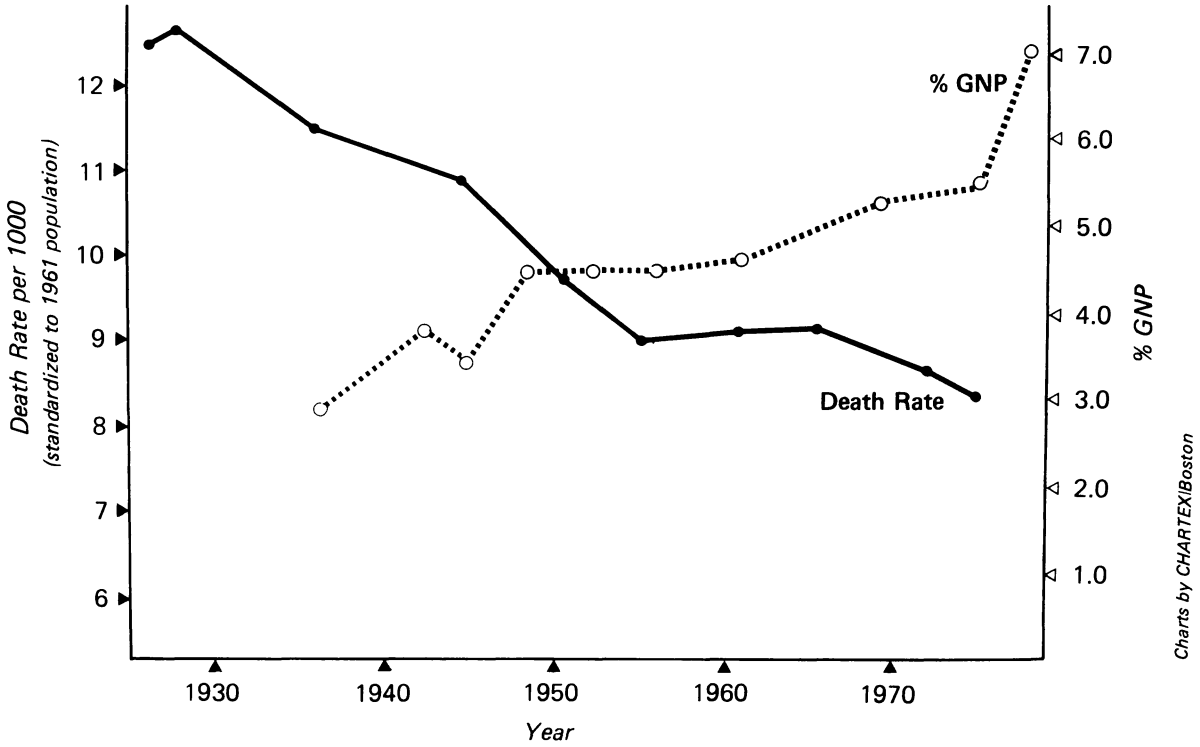

FIG. 4. Death rate per 1000 (standardized), contrasted with the proportion of the gross national product expended on health care, 1928–1975.

devoted to health care. Although the death rate declined dramatically between 1930 and 1955, it has leveled off over the last twenty years or so. But over this same period, the proportion of the GNP devoted to health care has more than doubled. The absurdity revealed by Fig. 4 is that the precipitate and still unrestrained increase in medical care expenditures began when almost all of the decline in New Zealand mortality this century had already occurred!

For non-Maoris since 1880, and for Maoris since 1950 (the earliest time for which reliable statistics are available), life expectancy at birth (the average number of years that members of a hypothetical group would live if they were subjected throughout their lives to the age-specific mortality rates observed at the time of their birth) has increased for both males and females, the increase being somewhat greater for non-Maoris. Nothing like the same improvement is evident in life expectancy at the other ages considered (20, 40, and 60 years). When life expectancy at different ages is considered, most of the gains during this century have resulted from the known decline in infant mortality, primarily from infectious diseases. And consistent with what has been shown by McKeown (1976) for England and Wales, and McKinlay and McKinlay (1979) for the United States, specific medical measures (either chemotherapeutic or prophylactic) appear to have contributed little to this reduction. Over the last twenty-five years or so, there has been little improvement in life expectancy at ages 20, 40, and 60 years, for either sex or ethnic group. Indeed, among Maoris, there may have been some decrease in life expectancy at age 60.

It may be that this discussion focuses on mortality and ignores the important areas of morbidity and disability where, it is claimed, medical care inputs may have had a detectable impact. In New Zealand, the *only* reliable information on the course of diseases over time, in large population groups, consists of mortality data. Other corroborative indications (e.g., prevalence data on morbidity, restricted activity days, bed days, days of limited activity, etc.), although sometimes available in other countries, are not generally available in New Zealand. New Zealand clearly has paralleled the mortality trends of most other similarly situated countries, and there is little reason to think that, overall, New Zealand has not done so with respect to other

measures of output such as morbidity. If, as is likely, New Zealand has followed the pattern now evident in, say, the United States, then the expected life free of disability may not have increased with the small increase in life expectancy that appears to have occurred in some age categories (McKinlay and McKinlay, 1979). In other words, whatever slight gains in life expectancy have occurred at certain ages, they may have been merely gains in years of disability due, in large part, to chronic disease, and there may even have been some decrease in years free of disability. Certainly, from the mortality data that are available in New Zealand, it appears that the country is getting a poor return from its not inconsiderable investment in traditional medical care and, in the absence of corroborative morbidity data, there is no reason to qualify the contention that the present pattern of medical care inputs is yielding a poor return in terms of the nation's overall health status.

When limited resources are available, what is devoted to one area obviously subtracts from what is available for others. The vast sums devoted to the care (not cure) of such chronic conditions as heart disease, cancer, and stroke must subtract from what is available for areas with a potentially better return on investment, such as community health and primary health care. In the light of these data concerning the poor relation between medical care inputs and mortality outcomes (Cochrane, St. Leger and Moore, 1978; McKinlay, 1978b), it is reasonable to challenge the basis upon which resources are allocated to health care in New Zealand. The usual administrative response to such data is to maximize inputs to all aspects of the existing system in the hope that some beneficial outcome will occur somewhere. The economic vicissitudes already described have foreclosed the possibility of continuing this course for much longer.

General Structure

Like so many other countries, New Zealand has a hybrid system of medical care. Its origins can be traced to the English system, particularly the emergence of hospitals during the eighteenth century, and it was developed during the nineteenth century to accommodate the particular health needs of the population as it was distributed at that time. Since then the system has been disfigured by political pressures,

public demands, professional self-interest and, more recently, massive and now habitual infusions of overseas technology. Medical care in New Zealand now rests, somewhat precariously, on foundations that have remained largely uninspected since they were first laid over a century ago. So ingrained is the commitment to the existing system, so powerful the interests behind it, and so institutionalized the response of simply adding more of the same, that it was only as recently as 1974, with the publication of a government White Paper (*A Health Service for New Zealand*), that a pattern of health care structurally different from the predominant hospital-based system was seriously contemplated. Until then, the provision of additions to, rather than replacements of, now outmoded hospital-based services had been the preferred response (New Zealand Government Printer, 1974).

Very briefly, the major components of New Zealand's medical care system are as follows:

1) *The minister of health* is a publicly elected member of the government (the majority party in Parliament) and a member of the prime minister's cabinet, who is responsible for all activities undertaken by the Department of Health, and usually covers issues and questions relating to health that may arise in Parliament. The prime minister alone decides who shall be minister of health, the decision being determined largely by political considerations (e.g., to balance perspectives in cabinet, ensure like-mindedness, political patronage, etc.). The minister may have some qualifications or experience in the area of health care, but usually does not. On occasion he/she may have had the advantage of serving an apprenticeship as "shadow spokesperson on health" before assuming a government's portfolio of health. Since there are general elections every three years, a minister is usually associated with the Department of Health only for this short period of time, before either the government is defeated, or he/she is promoted to more senior cabinet rank (e.g., education, industries and commerce, labor). This frequency of ministerial turnover presents difficulties for continuity of departmental policy. A minister may take up to a year to "find his feet" in a new portfolio. Since much of the third year in office is devoted to public posturing, with a view to a favorable result at the general election, little more than a year may be available for a minister to seriously implement new policies. The

minister must compete with other high-ranking cabinet members for his/her piece of the fiscal pie.

2) *The director-general of health (DG)* is a permanent civil servant and is responsible to the minister of health for the organization of the Department of Health, and for implementing any policy the government may have with respect to health care. The person occupying this position is statutorily required to be medically qualified but there is no requirement for the special training or experience that may equip him/her for such an important administrative post. A detailed account of the activities of the Department of Health is given in the annual report of the director-general of health, which the minister of health submits to Parliament.

3) *The deputy directors-general of health* are also permanent civil servants who are responsible to the DG for the organization and management of the particular division they head (e.g., clinical services, public health, hospitals, mental health, nursing, dental health, and administration). With the exception of the deputy director-general for administration, those at this rank are all medically qualified. Although they command considerable resources and manpower, they are not formally required to have special qualifications or experience in such fields as health planning, evaluation research, medical economics, social policy, or even management and administration.

4) *Hospital boards.* The country is divided into twenty-nine hospital districts. General and psychiatric hospitals in these districts are controlled by locally elected hospital boards. A hospital board of eight to fourteen members is elected every three years for each hospital district from the local population. It is the duty of every hospital board to provide, maintain, and staff such institutions, and such medical, nursing, and other services as the minister of health considers necessary. Until 1957, hospital board activities were funded jointly by the central government, contributions from the local authority, voluntary contributions and bequests, patients' fees, and social security payments. After 1957, local hospital boards were funded entirely by the central government, and their expenditures escalated. Despite several attempts to ensure that hospital boards work strictly within allocations approved by government, culminating in legislation in 1973 that rendered members of a hospital board personally liable for overexpendi-

ture, the regulations have proved difficult to enforce. The hospital board is the backbone of New Zealand's present medical care system. All activities, including nursing training, community health activities, and primary care radiate out from a hospital base. Hospital activities are not one part of a package of community health services; instead, they are the center around which all revolves. (Some even view community health nursing as a system in which hospital-based nurses drive out into the community to visit patients who are not able to go to the hospital.) The community health activities that have developed in recent years have been additions to, rather than independent replacements of, hospital-based activities. Those appointed to a senior post on the board (hospital board secretary, hospital superintendent, etc.) are not required to have special qualifications or experience in the area to which they are appointed. It is possible for a physician whose life has been spent in general practice to be appointed superintendent of a multimillion-dollar medical complex centered in a large hospital.

5) *Health districts.* In each of the eighteen health districts, which overlap hospital boards, there is a medical officer of health (MOH), who is always a medical practitioner and supposedly has special qualifications in public health. The MOH is involved with and is an advisor to all local authorities in the district. The approval of the MOH is usually required before action can be taken on health-related matters by a local authority, and sometimes the MOH is the first line of appeal against its decision. The MOH is required to keep the director-general of health and the board of health informed of deficiencies in the way the local authority carries out its responsibilities under the Health Act of 1956. Many people believe that changes in organizational structure and disease patterns have rendered the MOH a legacy of the past, which should be dispensed with.

The Public versus the "Private" System

There is much discussion in New Zealand of what are termed "private health services," and the nature of their relation to the public system. Since the arrangements to which the term refers can in no way be regarded as "private," this discussion is largely misplaced, and serves the interests of particular groups. Successive governments have sup-

ported the development of "private" hospitals on the ground that every private hospital bed is one less bed that the government has to pay for and maintain. But the general public, through the tax system, do in fact pay for and maintain "private" facilities. The position of these expanding private facilities has been secured through government-financed capital loans, various subsidy schemes, and periodic increases in hospital benefits. In other words, the growth of the so-called private system has continued virtually unchecked, and is heavily subsidized by the public sector, so much so that the term "private" is now a misnomer. Since 1938, all governments have accepted the compatibility of a dual system. Private health insurance has grown rapidly in the last several decades, especially since 1967, when premiums were made tax-deductible. Nowadays, about 10 percent of the population has some kind of medical care coverage through private health insurance.

The premise underlying the public system is that medical care should be free and readily available to all on the basis of need, rather than on the ability to pay. The growth of the private system is attributed to, or justified by, some purported deterioration in the public system that, it is claimed, jeopardizes the goal of readily available free care on the basis of need. For example, a so-called public desire for the alternative of private beds is often attributed to lengthy waiting lists for public beds, an issue that is of understandable public concern.

This matter of public hospital waiting lists illustrates a worrisome feature of New Zealand medical care: how the medical establishment, particularly "the profession," can contrive public demand and thereby manipulate the government into subsidizing a private system that is more favorable to its own interests. At least three important aspects of the medical system are conducive to such manipulation. 1) Medical services are provided in public hospitals largely by part-time or consultant physicians and surgeons, who frequently maintain parallel private practices. 2) Salaries or fees paid through the public hospital system tend to be low compared with fees charged privately. 3) The individual patient in a private hospital is responsible only for hospital expenses over and above a minimum allowance paid by the government (and even this excess may be paid through third-party insurance).

Given these conditions, it is easy for part-time physicians either to create a public hospital waiting list or to force patients into the private sector, at some extra cost to the patients, producing much higher income for themselves. Dr. A. may say to Mrs. B., upon agreeing that she should have her varicose veins stripped, that she must wait over a year if he is to perform the operation in a public hospital, or only a couple of days if in a "private" hospital—for which she must pay a little more. This does not represent a situation of "free choice," especially when patient *demand* has been translated into a *need* during a consultation. This situation is reinforced by the nature of the medical problems of the patients on public hospital waiting lists, which tend to be either nonurgent or elective surgical procedures. Only occasionally does a patient with a genuine emergency or urgent case experience difficulty gaining admission to a public hospital, an event seized upon by the media as newsworthy—an indication of its relative infrequency. In one particular hospital district, a relatively small waiting list increased rapidly after the opening of a private hospital, contradicting the original rationale for building this extra hospital. Some claim that the public hospital waiting list serves as an effective regulator of what may be unreasonable and insatiable public demand, a demand that is in large part contrived.

This phenomenon is further encouraged by a financial reimbursement system that favors hospital-based interventions over the less expensive, but just as effective, ambulatory procedures. By furthering a state of affairs in the public system that favors the alternative of private medical care, the medical establishment appears to have the government over a barrel. The interests that benefit from the existence of the private system also have a hand in the generation of problems in the public system that are a major justification for its (private system) existence. What is paradoxical is that government should so heavily finance the very process through which the "alternative" system is largely justified.

The issue of "private" versus public medical services in New Zealand remains problematic. While the government is being forced toward fewer beds because of economic considerations and, perhaps, evidence of the superiority of some ambulatory or outpatient procedures, private interests continue to expand even further, on the fairly

safe assumption that the government will continue to pick up the costs. The position of one recent government was outlined as follows:

> The progressive improvement of State health services will restore true freedom of choice for patients. The Government believes that the true role of the private sector is to meet the medical needs of those citizens who freely and voluntarily elect to not use State provided health services and are prepared to meet the full cost of private services. Should they wish to meet this expense by private insurance, they should be free to do so. When it has been established that patients seeking private treatment do so from freedom of choice, and not in an effort to circumvent the difficulties of the public system, the real need for private health services will be more properly determined. (New Zealand Government Printer, 1974)

The Oversupply of Hospital Beds

An issue that continues to plague social policy in New Zealand is the way in which the government is locked into, and unable to significantly alter, patterns of resource allocation first established over a century ago. Although the problem is perennial in many different countries, and affects different areas of public expenditure, it is well illustrated in New Zealand with respect to the number and geographical distribution of hospital beds. During the nineteenth century, when New Zealand was a sparsely settled British colony, there was a short-lived gold rush on the west coast of the South Island. Although it is difficult to believe, the pattern of resource allocation established at that time (based on the distribution of population and the nature of the problems at that time) has persisted to the present day, despite the fact that the population distribution and the nature of the medical problems have changed remarkably over the ensuing century. Table 1 shows the remarkable increase in the number of hospital beds over the period 1874–1976.

Although the larger number of beds reflects the overall population increases, as expected, some marked regional anomalies remain. One reason is that hospital board expenditure remains subject to control by the minister of health who, in turn, is vulnerable to pressure from the medical establishment, public opinion, etc. To compound this, hospital board allocations for public hospital maintenance are based on

TABLE 1
The Increase in Public and Private Hospital Beds in New Zealand, 1874–1976

Year	Public Sector		Private Sector		Total	
	Number	Rate/1,000 Population	Number	Rate/1,000 Population	Number	Rate/1,000 Population
1874	1598	4.63			1598	4.63
1878	1974	4.31			1974	4.31
*1886	2822	4.55			2862	4.55
*1896	3708	4.99			3764	5.06
*1906	5296	5.66			5374	5.74
*1916	8612	7.49			8686	7.56
*1926	12548	8.91			12622	8.96
1936	15529	9.87	2596	1.65	18125	11.52
1946	18917	10.75	3254	1.85	22171	12.60
1956	22961	10.56	2822	1.30	25783	11.86
1966	25528	9.54	3644	1.36	29172	10.90
1976	27209	8.69	4982	1.59	32191	10.28

Sources: Provisional results of the 1976 census, New Zealand; and Department of Health, Wellington, New Zealand, 1978.
*The total includes some private beds, which were not consistently recorded for separate tabulation.

allocations made in the previous year, adjusted to take account of known increases in commitments, plus an allowance for normal growth. Funds are therefore allocated to local hospital boards, not primarily on the reasonable basis of population numbers, but rather on the established number of beds. The higher the number of beds per capita, the higher the allocation. This linear relation was investigated and produced a correlation of 0.65. Some of New Zealand's most populous areas, such as Auckland (800,000), North Canterbury (344,000), and Wellington (344,000), appear at the lower end of the scale in terms of both proportionate allocations and beds, whereas sparsely populated rural areas like Waipawa (13,000), the West Coast (34,000), and Taumaranui (12,000) appear toward the top end of the scale.

According to a recent report of the Organization of Economic and Cooperative Development, New Zealand currently spends proportionately more of its health dollar on hospital activities than any other country in the world. While there was an eight-fold increase in population over the period 1874–1976 (from 345,000 to over 3 million), there was more than a nineteen-fold increase in hospital beds (from 1,600 to over 32,000) in the same period.

Most countries do not support the high ratio of 10.2 beds per 1,000 population that now exists in New Zealand. The variation in the number of hospital beds available in different countries is in no way reflected in variations in either mortality or morbidity (Cochrane, St. Leger, and Moore, 1978; McKinlay, 1978b). In other words, a two-fold difference between countries in the proportion of resources devoted to hospital activities does not produce a two-fold difference in any of the standard output measures such as mortality or morbidity. The Department of Health recently issued some planning guidelines for hospital beds and services, which proposed that there be 8 beds per 1,000 population (Department of Health, 1977). This composite figure was arrived at after separate calculations of the ratio of beds that some feel are required in five different areas (pediatric, adult, geriatric, maternity, and psychiatric) per 1,000 age-specific population. Where these ratios originated, no one seems to know. They appear without any justification or reference. A ratio of 8 beds per 1,000 population is up to twice as high as the existing ratios in

some other countries with a social and economic structure similar to that in New Zealand, and with almost identical mortality and morbidity outputs. The New Zealand Government (through the Department of Health) is now using these arbitrarily derived guidelines as a basis for social policy concerning the number and distribution of hospital beds.

Recognizing the absurdity of the level of bed provision recommended in these guidelines, let us consider how many beds are available at present. A comparison of the overall number of beds recommended (25,399) with the number actually available (31,836) revealed a surplus of some 6,437 beds. If we assume that the average hospital bed costs the state, say, $150 per day (whether or not it is occupied), then this surplus, over and above the high ratio proposed by the Department of Health, costs the New Zealand taxpayers in excess of $35 million each year, or around $12 for every man, woman, and child. And the state appears powerless to do anything about the oversupply of beds, even though it is forced to pay the bill. Wastage of such magnitude reveals how hollow the objection is that New Zealand simply does not have the resources to engage in proper health services research. Imagine the saving that would result for this small country if hospital bed numbers were brought down to the level most other similarly situated nations find adequate to their needs.[2]

A study of the relation between the number of hospital admissions per 1,000 population and the number of public hospital beds per 1,000 population revealed what Roemer (1961), among others, has already demonstrated for the United States: the higher the bed ratio, the higher the admission rate ($r = 0.45$).[3] In other words, the hospital

[2] Federal health planners in the United States have proposed the elimination of 100,000 unneeded hospital beds over the next seven years by reducing the ratio of general beds from its present 4.5 to 4.0 per 1000 population. Aside from the $80,000 capital investment in each of these unnecessary hospital beds, with an annual operating cost of $40,000 per bed, some $4,000 million ($40,000 × 100,000 beds) of America's resources are consumed each year by these superfluous beds (*New York Times*, September 29, 1977).

[3] Milton Roemer (1961) found that a sudden increase in the supply of hospital beds in one county in the eastern United States resulted in a prompt rise in the hospital admission rate and in the average length of stay for most patients. After years of "getting along" with a bed supply of 2.9 general beds

admission rate in New Zealand rises to fill the additional number of beds that are available in certain areas.

An even stronger linear relation ($r = 0.74$) exists between the number of public beds per 1,000 population and the average length of stay. In other words, where there is an excess of beds, not only does the rate of admission increase, but patients have a longer average stay. These factors combine to increase the probability of an individual's exposure to medical technology through hospitalization.

The hospital system is the conduit through which medical technology flows and becomes a permanent part of the health care system. Physicians abet this process by opening the spigot wider and wider. Some of this technology flows into socially useful areas and beneficially alters the course of some problems. Much of it, however, flows into areas that are either barren, or already "overtechnologized," and therefore are superfluous. Experience to date would suggest that the state, while protesting wastage and superfluity, is powerless to prevent them, and is forced to subsidize the whole process. This impotence in the face of the proliferation of high technology will continue until the state can effect some alteration in the hospital structure that now requires it, and without which so rapid an expansion could not occur. Controlling the hospital system is a necessary but not sufficient condition for controlling the proliferation of unevaluated high technology as applied to medicine.

The problem of the proliferation of unevaluated high technology (to be considered in the final section) cannot be separated from this problem of the oversupply of hospital beds. Some kind of vicious circle appears to operate. The medical establishment maintains that it must constantly expand hospital and related activities in order to accommodate new and ever more sophisticated technology. The

---

per 1000, the supply suddenly increased to 3.8 per 1000. At the old level, the hospital was not overcrowded, having an occupancy of 78 percent. With the increase in bed supply, however, there was an abrupt rise in the admission rate of the study hospital, and no compensatory decline in the admission rates of other nearby hospitals. At the same time, the average length of stay for 40 out of 53 patients increased. The utilization rate by Blue Cross members in the study hospital rose by 38 percent, in response to the 42 percent rise in the study hospital's bed capacity.

(mainly overseas) manufacturers of high technology maintain that new, bigger, more sophisticated technology is necessary in order that hospitals can be more cost efficient, achieve "economies of scale," and so forth. The activities of the constituent parts of the health system seem to be employed by each as a justification for the scale and direction of their own activities.

The Problem of Too Many Physicians

The structural problems besetting New Zealand health care cannot be compartmentalized or satisfactorily resolved through social policies initiated by New Zealand alone. They are related to other problems, and of a magnitude that now requires coordinated action by other governments as well. Nowhere is this more evident than in the oversupply of medical manpower, a situation New Zealand shares with most other countries. In the context of the economic difficulties now confronting the country, this problem must be considered of the highest priority for social policy. Because physician oversupply is so intertwined with other structural problems (e.g., the oversupply of hospital beds, the medical establishment's ability to steer the state, and the proliferation of high technology), action is necessary here if policy is ever to intervene effectively on these related problems, and vice versa. Moreover, since the oversupply of medical manpower is a problem shared with other countries, and because of the circulation of medical workers between different countries, social policy in this area must be coordinated with the programs of other countries, particularly such British Commonwealth partners as Australia, Canada, India, and Great Britain.

It is estimated that there were about 69,000 workers in the health sector of the New Zealand workforce in 1976: that is, 1 health worker for every 45 people in the total population, or 1 such worker for every 18 people in the workforce. By the turn of the century, when the population is projected to reach 3.7 million, these ratios are expected to decline to 36 and 14 respectively.[4]

Attention is focused on physicians because 1) they generate more

[4] These figures were prepared by the Management Services and Research Unit, Department of Health, Wellington, New Zealand, 1978.

costs for the state than any other category of worker; 2) reliable up-to-date figures are available on physicians from regular surveys by the Medical Council of New Zealand; 3) any increase in the number of physicians is integrally related to the proliferation of technology (the issue taken up in the final section); and 4) the problem of too many doctors is an area in which the state is now beginning to act. The abundance of physicians also illustrates how the common health problems of different countries now require social policies coordinated among countries. There is no uniquely New Zealand solution to the country's problem of oversupply of doctors. Any realistic solution now requires action by other countries as well. New Zealanders still talk about a "national health manpower policy," when the nature of the problem and all available data indicate that an international or multinational health manpower policy is required.

There are today just over 4,000 physicians in New Zealand, 1 for every 764 people. By the turn of the century (2001), the number is conservatively expected to double to 8,000, or 1 physician for every 465 people in the population (Salmond, 1978). The hospital board areas in North Island and South Island are sketched in Figs. 5a and 5b; Table 2 shows the population of each area, and the distribution of general practitioners (GPs) and hospital beds throughout the country. Some areas have a large number of doctors (fewer than 2,000 people per GP), and others seem to have relatively few (more than 4,000 people per GP). Clear concentrations of GPs exist in Northland, Tauranga, and Nelson, three well-known resort areas with very favorable climates. The large number of GPs in Otago, in the South Island, is probably an aberration attributable to the presence of what was until recently New Zealand's only medical school. It is noteworthy that a contiguous hospital board (South Otago) should be so undersupplied with doctors.

Why is any further expansion in the supply of physicians (possibly even the retention of existing numbers) bound to produce calamitous consequences for New Zealand's already fragile economy? Estimates vary widely, but it now costs about $80,000 to train a physician in New Zealand. The 1979 annual output of 243 medical graduates is expected to increase to 310 by 1981. As in most other countries, medical students are generally drawn from the highest social classes.

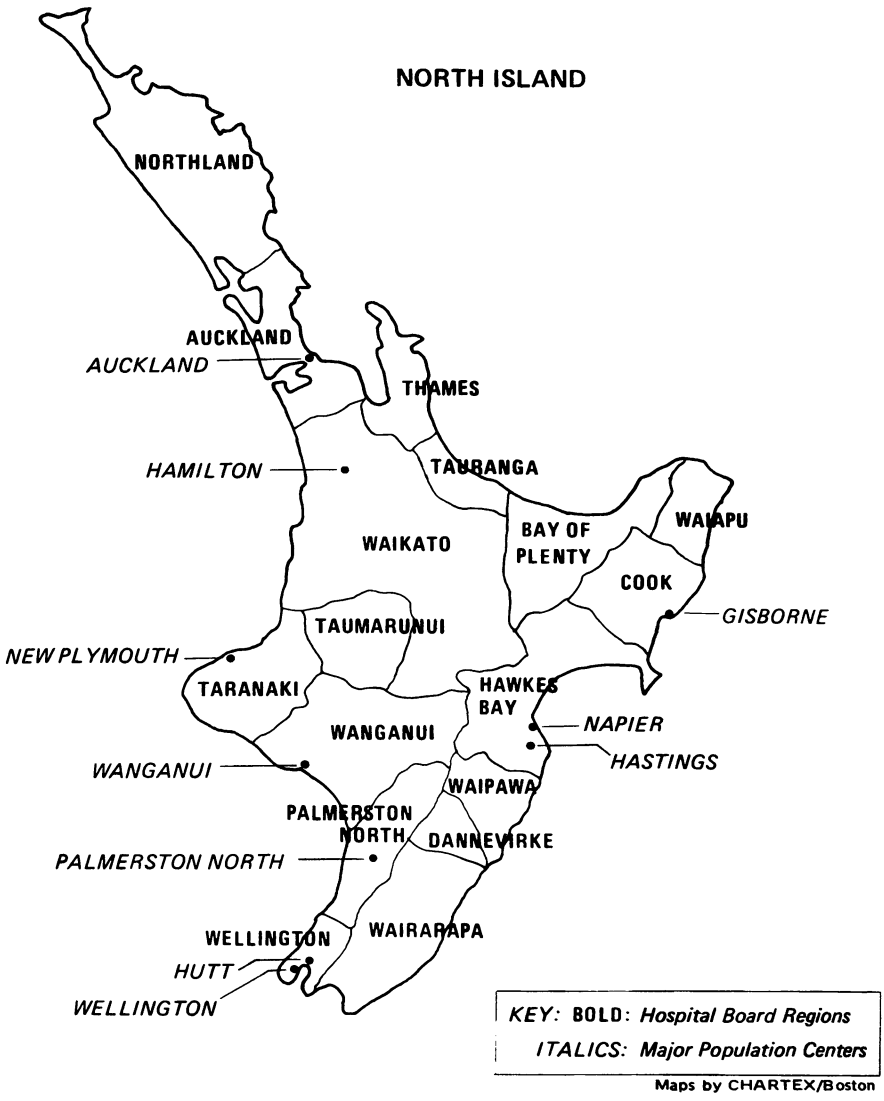

FIG. 5a. Hospital board regions and major population centers in North Island.

Although the costs of their training (currently about $19 million a year) are met through public funds, there is no requirement that physicians work for some period of time in the underdoctored areas already discussed, or that they remain in the country. Since the early sixties, the country has lost about one-third of its medical graduates by

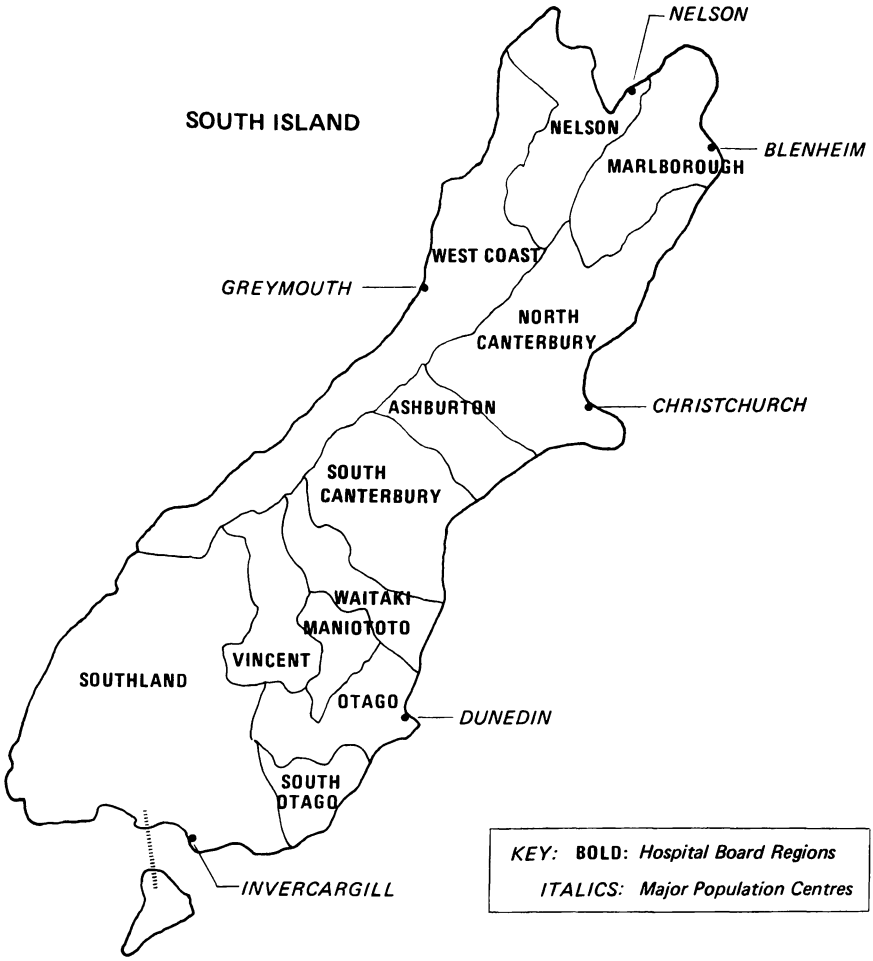

FIG. 5b. Hospital board regions and major population centers in South Island.

permanent emigration. In 1978, 171 emigrated overseas and 80 returned to the country, leaving a net loss of 91 New Zealand-trained physicians, over one-third of a year's total output! Over the last eight years, there has been a net outflow of 325 nationals, or the equivalent of three entire graduating classes.

Assuming that over the eight years 1970–1978 it cost an average of, say, $50,000 to train a physician, then the net outflow of 325 over this period represents an economic loss of around $17 million. At the present cost of around $80,000, the net outflow of 91 during 1978

TABLE 2

The Distribution of General Practitioners (Full-Time Equivalent) and Hospital Beds by Hospital Board Area in New Zealand

Hospital Board Areas	Area Population, 1976*		General Practitioners (Full-Time Equivalents)		Public and Private Hospital Beds, 1977	
	Number	Percent of Total Population	Number‡	Per 1,000 Population	Number§	Per 1,000 Population
North Island						
Northland	106,743	3.4	59.4	0.60	778	7.2
Auckland	796,506	25.5	360.7	.45	6990	8.8
Waikato	320,411	10.2	140.3	.44	3114	9.7
Thames	33,619	1.1	13.4	.40	282	8.4
Tauranga	66,387	2.1	36.9	.56	510	7.7
Bay of Plenty	44,467	1.4	11.8	.26	281	6.3
Waiapu	4,606	0.1	1.0	.22	44	9.6
Cook	41,136	1.3	18.3	.44	346	8.4
Hawkes Bay	121,508	3.9	41.6	.34	964	7.9
Waipawa	13,195	0.4	2.9	.22	210	16.0
Dannevirke	12,317	0.4	2.3	.19	149	12.1
Waiarapa	46,726	1.5	11.5	.25	376	8.0
Taumaranui	12,454	0.4	5.2	.42	139	11.2
Taranaki	99,312	3.2	41.9	.42	756	7.6
Wanganui	75,716	2.4	23.5	.31	599	7.9
Palmerston North	125,893	4.0	52.9	.42	1846	14.7
Wellington	344,338	11.0	137.3	.40	3526	10.2

South Island						
Marlborough	31,649	1.0	13.4	.42	264	8.3
Nelson	64,352	2.0	39.8	.62	1214	18.9
West Coast	34,818	1.1	14.7	.42	760	21.8
North Canterbury	344,017	11.0	151.7	.44	4132	12.0
Ashburton	25,316	0.8	9.5	.38	317	12.5
South Canterbury	62,027	2.0	21.7	.35	511	8.2
Waitaki	22,576	0.7	7.2	.32	193	8.8
Otago	129,187	4.1	69.3	.54	2291	17.7
South Otago	17,159	0.6	3.9	.26	197	11.5
Vincent	9,483	0.3	3.2	.34	75	7.9
Maniototo	2,547	< 0.1	1.0	.39	33	13.0
Southland	116,568	3.7	35.9	0.31	939	8.0
Total	3,125,031	99.6†	1348.2	0.43	31,836	10.2

*Figures taken from the 1976 Population Census
†Total does not equal 100 percent, because of rounding.
‡These figures include the contribution of both "pure general practitioners" and general practitioners to the area of obstetrics and gynecology.
§Figures taken from data prepared by the Management Services Research Unit, Department of Health, Wellington, 1978.

represents a loss of over $7 million. For a country as small as New Zealand, with its economic problems and unique vulnerabilities, this represents a poor return on a very large investment. Even worse, these recent medical graduates contribute some of their best years to the economies of countries that are New Zealand's international competitors. In effect, New Zealand is underwriting some of the high costs of training physicians for its economic rivals—an international beneficence the country simply cannot afford.

Now it is true that, over the past eight years at least, this outflow of nationals has been offset by a net inflow of other nationals—971 since 1970, or an average of 121 a year (Salmond, 1978). Although many of these foreign graduates fill gaps in needed specialties, and undoubtedly contribute something to the overall health of the public, they sometimes exacerbate existing problems. Their training is sometimes inappropriate for the local scene; patients may have difficulty understanding foreign physicians. More important, foreign-trained physicians sometimes bring an inflated conception of what is possible, and demand the resources and technology to which they are accustomed (perhaps even dependent on) overseas. With only limited resources, there is sometimes difficulty fulfilling what must be considered, at least from the New Zealand viewpoint, grandiose expectations. One well-known specialist with overseas experience contends that six CAT scanners (one in each of the major cities) are essential if the country is to attract and hold appropriately qualified radiologists. Here the expansion of technology is being employed as an argument to attract highly trained medical graduates from abroad.

Over the last three years, the net overall gain in physicians has declined from 176 in 1976, to 88 in 1977, to a *net overall loss of 37 in 1978.*

The resources devoted to medical education and the losses incurred through emigration are undoubtedly a serious problem for so small a country. They are relatively minor, however, when compared with the costs physicians force the state to assume *after* their training. Upon graduation, each new physician can, without any real limit, authorize benefits, prescriptions, tests, procedures, and so forth that, under the present system, the state is obliged to finance. The annual cost incurred for the state by a GP has been estimated to be at least

$100,000, and the figure for some specialists has been put as high as $250,000. In a single year, a medical graduate commits the state to costs that exceed those already incurred during the six years of training. Given that a physician works for, say, forty years, a single medical graduate over a working lifetime commits the state to further costs far in excess of $4 million ($100,000 per year times forty years). Multiply this $4 million by the annual number of medical graduates (now 243) and the approximate potential annual commitment of the state is $1 billion—equivalent to 7 percent of the GNP, or the total annual amount the country at present spends on health! And this cost repeats itself every year. These rough figures are unadjusted for such factors as the effects of inflation and the immigration of foreign medical graduates, which would probably increase the amounts projected.

Early in 1979, the New Zealand Planning Council proposed that medical school intakes be gradually reduced by 25 percent. In implementing this proposal, the government, instead of taking the difficult but logical step of closing one of the country's four medical schools, has retained all of them and simply reduced the number of students in each, thereby actually increasing the cost of training a physician (because of the reduction in "throughput" per school). Although the action to reduce the number of medical graduates is a bold one and certainly not to be depreciated, it must be reinforced by action to dismantle part of the structure that exacerbates and reinforces the problem of the oversupply of physicians in the first place.

The Invasion of Unevaluated High Technology

Unless there is some collateral resolution of at least the issues discussed so far, the country will never resolve the problems concerning medical technology. For example, with the private sector absorbing the profitable, low-risk, low-technology, elective procedures, the public sector is left to support a disproportionate number of high-risk, high-technology procedures.

At the same time, unless the large number of public hospital beds is reduced to economically realistic levels and distributed more equitably, this major mechanism through which technology is introduced

will ensure its survival. Since physicians' demands help stimulate the proliferation of high technology, some action is also required on the problem of the oversupply of physicians.

In other words, to move toward the resolution of problems associated with high technology, the state must move simultaneously on these problems that, at first sight at least, may appear unrelated. Moreover, effective social policies for each of these other areas requires collateral action on the problem of high technology. Piecemeal or compartmentalized social policies are unlikely to provide appropriate structural solutions to such structural problems (McKinlay, 1979b).

To properly understand the proliferation of unevaluated high technology anywhere in the world, it is necessary to trace it to its principal source: the world-wide invasion of the medical care sector by large-scale financial and industrial capital. Through the presence of such interests over the last several decades, the shape and content of medical care around the world are being dramatically transformed. Since the phenomenon is world-wide, no solution is likely to emerge from analyses and policies that are confined to particular national settings. To understand and act upon the proliferating high technology in New Zealand, the problem must be viewed in relation to developments abroad, especially in the United States (Waitzkin, 1979).

Elsewhere I have described how the medical care sector, at least in America, has been rendered a highly desirable arena for large-scale financial and industrial interests (McKinlay, 1977, 1978c). Although the features that make medical care so attractive are shared with other sectors of the economy, in the medical arena they cluster as a unique constellation that is conducive to reducing uncertainty in the market and to increasing the probability of high levels of profit. Some reasons are 1) the existence of a large and often captive market (all people are ill some of the time and some people are ill all of the time); 2) the primacy given by the public in the demand for medicine over other commodity consumption, and the apparent insatiability of this demand; 3) the facilitation of a control over the public; 4) the possibility of controlling a valued technology and thereby improving the competitive position; 5) the state acts as a guarantor of profit; and 6) through association with medicine, private interests may project an image of

conspicuous benevolence. Some of these features have been associated with medicine for a long time, but others, particularly the partisan involvement of the state, have been fostered by those interests most likely to benefit from them.

Given these features (as well as internal pressures in other sectors of the economy), it is not surprising that large-scale financial and industrial capital has invaded and is now exploiting the medical care sector. Such multinationals as General Electric, IBM, Xerox, Kodak, Champion Sparkplugs, Firestone, among many others, have large medical enterprises within their corporate families. Aerospace companies are involved in everything from computerized medical information systems (Lockheed) to life-support systems (United Aircraft). Tobacco companies (Philip Morris manufactures surgical supplies), brewing concerns (Pabst Brewing makes drugs and pharmaceuticals), and transportation enterprises (Greyhound also manufactures drugs) are involved. In addition to these industrial institutions, many even larger financial institutions—commercial banks, life insurance companies, mutual and pension funds, diversified financial organizations and foundations—are increasing their association with medical care and experiencing phenomenal success. Many of these multinational concerns have assets in excess of the entire GNP of New Zealand, and many much larger countries. These institutions and their products have now become a permanent part of the medical care landscape around the world, even in so remote a country as New Zealand. Since there is usually some time lag before technology finds its way across the Pacific and into the New Zealand health system, the country is in a unique position to learn from both the successes and the failures of other countries. It may even be able to assume a leadership position through the provision of scientifically acceptable data to countries that, for reasons to be discussed, are now not able to obtain them.

Stages in the Introduction of Technology

During 1978, I was afforded a rare opportunity to identify the sequence of stages typically passed through when new technologies and interventions are introduced into New Zealand's medical care system. With its centralized organization and comparatively small size, the

country may be uniquely suited to such a study. The following sequence was identified: First, the multinationals already described are constantly producing and aggressively marketing new technologies. An ever-increasing proportion of New Zealand's export earnings is diverted into imports of these products. Second, through the sales effort, the medical establishment (mainly physicians, independently and through the hospitals they run) is encouraged to demand the very latest and most sophisticated of this technology. For a physician to be unfamiliar with or lack access to this technology is considered deficient, unprofessional, and perhaps even culpably negligent! For a hospital to be without it means that its competitive position is somehow jeopardized. Only by "keeping up-to-date" (which implies ownership or control of the very latest technology) can physicians and hospitals hope to cope with emerging problems and public expectations. Third, additional local demand is fostered through powerful community groups. There is some justification for the joking suggestion that "Lions Clubs are the health planners of New Zealand"!

It is common for local community groups to raise funds for various technologies (CAT scanners, cardiothoracic surgery units, expensive ambulances) and then donate them to the public system. Although they are acting with the best of intentions, their activities exacerbate existing problems by continually implanting new technologies, thereby forcing the state to meet the operating expenses—a cost that is often far in excess of the purchase price that it has already declined to meet.

Up to this point, most of the activity in support of some new intervention or service involves self-interested groups and organizations that are generally outside the formal decision-making process. This, of course, is not to overlook the considerable behind-the-scenes or informal pressures they bring to bear. At this fourth stage, these local activities become joined with interests, processes, and individuals in the formal decision-making structure. Social movements often fail at this point through an inability to articulate their goals with interests in, and members of, the formal decision-making structure. Success during this fourth stage is therefore critically important if some new intervention or service is eventually to find its way into the state-supported medical care system. The public seems to have greater access to the formal decision-making structure in New Zealand than

in, say, either the United States or Great Britain, perhaps because of such factors as relatively small population size and geographic isolation. The joining or engagement of informal outside interests with the formal structure can be achieved in several different ways. For example, community groups often put pressure on their member of Parliament (through letter-writing campaigns and local media efforts), who may respond by asking a formal question in Parliament. Such a question may extract a commitment to some undertaking from the government, which wishes to appear to be active or (especially in the case of an Opposition member's question) to remove the basis of some local complaint against the government. At this fourth stage, government, in various ways, accedes in the face of different political pressures and becomes committed to providing the intervention or service in question.

Eventually the state, through its various departments, purchases, underwrites, or subsidizes the new intervention or service. In the case of technology, the government pays the corporations that manufacture most of the technological hardware with export earnings. Manufacturers reinvest the profits and the whole cycle is repeated, albeit on an escalated scale. In a sense, the state fuels with one hand the fire that it is vainly trying to extinguish with the other.

The Matter of Effectiveness

Several features in this typical sequence must be of concern, but only one will be highlighted here: the absence of any prior demonstration of effectiveness. If the sales effort of the multinationals is vigorous enough, if the medical establishment deems it necessary, if enough of the public can be encouraged to demand it, sooner or later an intervention finds its way into the system, irrespective of its effectiveness or the resources diverted from other areas. The administrative rule of thumb in New Zealand (and most other countries) is that an intervention or service is presumed to be effective until it is shown to be ineffective. And even when research demonstrates repeatedly, and on commonly accepted methodological grounds, that it is ineffective, it is retained because of the power of the interests that become associated with, perhaps even dependent upon, its survival. A *Report of Family*

Statistics in New Zealand issued by the government's own Department of Statistics (1978) concluded that "it is probably true to say that hardly a single social welfare program operating in New Zealand today has had its effectiveness tested before, and after, implementation." Such a situation is by no means unique to New Zealand.

As one would expect in a country as small as New Zealand, there is a fairly tight-knit old-boy network among members of the medical profession. Until quite recently, there was only one medical school (Otago) and its graduates evidence considerable loyalty. It is not uncommon for all the major figures in the medical establishment (e.g., the director-general of health, some of the deputy director-generals, major members of the Medical Research Council, deans and professors of the medical schools) to have gone through medical school together. Someone once jokingly traced the origins of the New Zealand "medical mafia" to the class of 1954 (or thereabouts). On a number of occasions, when some proposal was being evaluated, particularistic allusions were made to someone's being "a good fellow when we were at Otago together." The failure of one foreign-trade medical school dean to establish a much needed primary care center in a relatively underprivileged area may be attributed not to the inherent worth of the proposal, but to his being "an outsider," and unfamiliar with "the New Zealand way of doing things."

The desire to do things "the New Zealand way," while certainly understandable, may be the country's most expensive national foible. The range of variability in illnesses and peoples is obviously not so great that New Zealand cannot, with safety, accept evidence from overseas. For what good reason can future social policy not be immediately informed by reputable overseas studies concerning the relative ineffectiveness of many standard medical practices? New Zealand certainly does not have the financial resources, or enough appropriately trained personnel, to replicate all of the expensive controlled trials that have already yielded definitive results. Nor are there always enough subjects to generate samples of sufficient size, from which reliable inferences may be drawn. This is not to suggest that New Zealand should not initiate clinical trials in strategic areas. Nor does a policy decision to routinely and systematically monitor overseas ran-

domized controlled trials (RCTs), with a view to their results informing social policy in New Zealand, necessitate undue delays while such studies are completed. Enough reliable results are already available, in many different areas, with which to immediately inform policy in New Zealand (and elsewhere) on the rational allocation of scarce resources to health care.

The Determination of Effectiveness

Some specific examples of decision-making in New Zealand will now be considered by reviewing two topical technologies: cardiothoracic surgery and computer axial tomography (CAT scanning). A couple of years ago New Zealand was wrestling with the question of how many cardiothoracic surgical units the country should have, and where they ought to be located. In a country of New Zealand's size, with its economic difficulties and scattered population, a decision on a single technology may have repercussions for the entire system. When questions like this arise, and because "everyone knows everyone else," the government sometimes, understandably, turns to overseas for advice (as distinguished from evidence). A well-known and respected cardiothoracic surgeon was invited to New Zealand in order to review the local scene and prepare a report with recommendations to the government. The resulting report, although it apparently influenced government policy concerning cardiothoracic surgery, for various reasons has never been released. Public and even parliamentary debate on the number and location of units remains uninformed by this report, even though the public paid for it. There are other concerns, however. It was subsequently revealed that the particular overseas consultant selected had a reputation for cardiothoracic surgery empire-building. Moreover, the recommendations in the report derive from a perfunctory visit, supplemented by the crudest of vital statistics. At the same time, it was widely known that the number of operations performed annually at the several existing cardiothoracic units was already below the minimum number considered by the American Heart Association as necessary to maintain surgical competency in the area.

There may be some support here for the view that the advice of carefully selected overseas experts is used to legitimate a course of action that has already been decided upon by the local interest groups.

Another common response to public issues is to establish a committee to "investigate and report"—a practice that is by no means unique to New Zealand (Alford, 1975). This was the response when the government was first faced with pressure for the introduction of CAT scanners. The composition of the committee established by the Department of Health physicians to consider this issue was such that the future of this technology was more or less assured in New Zealand. The government eventually decided to allow one scanner to be introduced first, on the condition that it be properly evaluated before other machines were introduced. A special grant was provided for the purchase, installation, operation, and evaluation of the scanner. From discussions and correspondence, it became clear that the physicians most involved do not themselves have the necessary methodological or statistical expertise to undertake a scientifically acceptable evaluation, and there is no evidence of their consulting available epidemiologists and biostatisticians who presumably could provide such expertise. After discussions with knowledgeable physicians and in collaboration with an experienced statistician, a proposal outlining one possible approach to the evaluation of the CAT scanner was prepared. The proposal was rejected, not because of any technical considerations (which the physicians were ill-equipped to comment on anyway), but because of so-called ethical objections, which have never been clearly elucidated. What is particularly disturbing is that the Department of Health was unwilling, or unable, to enforce the condition upon which the scanner was introduced, even though it provided funds for this purpose. In essence, the interested parties have reneged on their commitment, and the Department of Health is powerless to force compliance. There are suggestions that, with a population of over 3 million, the country ought to have five or six scanners. On the basis of past experience, the composition of the committees to date, and the nature of the overseas advice received, it is reasonable to assume that the medical establishment will eventually be favored with them.

New Zealand may be uniquely situated in the world to undertake

strategically important evaluations of some high technology, particularly because of the time lag between its establishment abroad and its introduction into New Zealand. This is well illustrated in the case of the CAT scanner. One common "ethical objection" to proper scientific evaluations (especially randomized controlled trials) concerns the withholding from individuals or groups of an already established intervention that, although without formal evaluation, is claimed to be effective. Now this "ethical objection" does not apply in quite the same way to newly proposed interventions that, at least at first, are in short supply. There is simply no way that all those perceived as "in need" can receive the purportedly effective new intervention in question. This situation of unavoidable scarcity in the beginning provides a unique opportunity for evaluation, without the usual ethical qualms. Some cases will not receive the intervention because there is not yet enough of it for everyone, not because it is deliberately withheld in the interest of evaluation research. Bradford-Hill has discussed this not unusual situation in relation to the introduction of streptomycin and the inactivated vaccine against poliomyelitis, both of which it would now be unethical to deliberately withhold for the purpose of an RCT. He argues that in such a situation

> it would have been unethical *not* to have seized the opportunity to design a strictly controlled trial which could speedily and effectively reveal the value of the treatment. [An evaluation] could proceed not only without qualms of conscience but with a sense of duty to do so. . . . Whenever a newly introduced drug or vaccine is scarce in its early days, then there presents an opportunity of which immediate advantage should, if possible, be taken. . . . With a serious disease in which the old offers very little hope of benefit, the new cannot be withheld. The chance of adequately and quickly assessing the value of the latter, if any, may never again occur. (Bradford-Hill, 1963)

New Zealand has long been dependent upon overseas experience, repeating the occasional successes and frequent failures of other systems. Its serious economic situation precludes the continuation of this wasteful course. New Zealand now finds itself in a unique position to evaluate certain technologies and provide information to other countries, which cannot themselves now undertake such evaluations. It is

doubtful whether a properly designed and conducted RCT of, for example, CAT scanning, is now possible in either the United States or Britain. Since at present there is only one CAT scanner for New Zealand's population of over 3 million people, and that one is situated in the very north of the North Island, it is inevitable that some patients, deemed in need of this machine, will not be able to receive its purported benefits. This unique situation will almost certainly soon pass, as New Zealand follows the pattern of other countries in allowing this still unevaluated technology to become a permanent part of the medical care landscape. Such an opportunity to assess this technology adequately and quickly may never again occur, and ought to be quickly seized. Not to do so can be considered *unethical!*

Cardiothoracic surgery and CAT scanning are discussed to illustrate the magnitude of the resources that are, or could be, tied up in what is either a demonstrably ineffective activity or one whose effectiveness has yet to be established. They represent a very visible tip of the iceberg of ineffective or unevaluated procedures and services that exist in New Zealand. Many other examples could be cited: radical mastectomy seems to be unnecessary for many cancers of the breast (Bunker, Barnes, and Mosteller, 1977); coronary care units do not represent the optimal treatment setting for many myocardial infarctions (Mather et al., 1976; Hill, 1978; Hutter, 1973; Harpur et al., 1971); and injection compression sclerotherapy on an outpatient basis is better than inpatient surgery for varicose veins (Chant et al., 1972; Beresford et al., 1978; Adler, 1978). It appears that the benefits of electronic fetal monitoring during pregnancy do not always outweigh the risks (Banta and Thacker, 1979). When permitted to do so, nurses deliver medical care as effectively as physicians, by any outcome measure selected (Lewis et al., 1969; Spitzer et al., 1974; Chambers and West, 1978; Schlesinger et al., 1973; Burnip et al., 1976). Coronary artery by-pass grafting (probably the most expensive surgery undertaken today) has been shown by two RCTs to be questionably effective (Mathur et al., 1975; Murphy et al., 1977).

The specific cases considered here illustrate a more general problem besetting the medical care system (of New Zealand and many other countries): the repeated adoption of unevaluated overseas technology. Cardiothoracic surgery and CAT scanners, per se, are of little concern

here. What is worrisome is the way in which procedures and services slip into the New Zealand medical care system, without any proper evaluation, either before or during their operation. Moreover, the state appears unable to stop paying the operating costs of the technologies it has already made a decision not to introduce. The legal maxim that a person is presumed innocent until proven guilty appears to apply also to technology associated with medicine. Any medically sponsored intervention is assumed to be effective until it is proven to be ineffective. And on those rare occasions when a procedure has been evaluated and shown to be ineffective, it is difficult to remove because of the pressure groups that become associated with and dependent upon its survival. I am certainly not opposed to cardiothoracic surgery, CAT scanning, or any other proposed technology. To be antitechnology is obviously to be antiprogress. What one should oppose is blind state support for the introduction and proliferation of all technologies, without any requirement that their effectiveness be properly demonstrated before or after introduction.

There are of course many human services that have been shown to be effective, on acceptable scientific grounds. For example, a broken leg, an acute asthmatic attack, or serious burns, should certainly receive effective medical treatment. But there is a vast range of services, procedures, and technologies—probably the majority—that, in New Zealand and elsewhere, have never been evaluated or shown to be effective on any grounds whatsoever, and may even be harmful. It is these questionably effective services that continue to tie up an ever-increasing proportion of New Zealand's ever-scarcer national resources, diverting funds from areas of more generalized effectiveness (e.g., community health and environmental management). The country cannot continue the naively conceived expansion of ineffective human services. Nor is it practical to begin the cavalier disposal of everything we have, a course recommended by visionaries such as Ivan Illich (1976). Both extremes are obviously absurd.

Effectiveness as a Basis for Social Policy

Since the state is viewed as responsible for providing the greatest possible benefit to the greatest number of people (utilitarianism), and

because the allocation of resources cannot continue to be based on (contrived) public demand, professional claims, or blind Micawberism, some other criteria must be invoked to inform social policy. Any policy based on ad hoc responses to particular interests, structurally precludes the state from allocating resources in accordance with utilitarian principles. Although the distribution of resources on a particularistic basis may occasionally coincide with some social needs, there is no structural mechanism for ensuring this agreement. It is therefore essential that some objective (i.e., interest-free) criterion inform the allocation of whatever resources are available in the future. It has been argued elsewhere that the prior demonstration of effectiveness may be such a criterion (McKinlay, 1979a).

Is it reasonable for the state to support activities that are either known to be ineffective or have never been evaluated, or activities whose proponents will not allow them to be acceptably evaluated? Is it not reasonable to expect that health workers would want to be involved in an activity shown, through the very science that is supposed to shape their practices, to be effective? Surely a public, with uncontrived human needs, ought to be able to assume that the interventions they are subjected to, which they support through the taxation system, are known to be effective. Is there any good reason why the state should support, through public funding for general public use, any service or procedure whose effectiveness has not been or cannot first be demonstrated? If demonstrated effectiveness can be accepted by policy makers as the primary criterion for the allocation of resources (a necessary but not sufficient condition for the public funding of an intervention), then the methodology for the determination of effectiveness becomes a critical issue in social policy.

Some would argue for an observational study (for example, a social survey or retrospective analysis of case records to evaluate effectiveness) (McKinlay, 1976). Although such studies may be useful in determining parameters of need for and the social acceptability of some intervention, they can never put the logically more important matter of effectiveness beyond dispute. Such studies are confounded by major unknown biases of self-selection, and one can never be certain enough, at least for social policy purposes, that it was the intervention, and not something else, that produced the result observed. Such knowledge can only derive from at least one (preferably

more) properly designed and conducted randomized control trial. Such experiments require that persons considered "in need" be randomly assigned to receive the new program (the treatment), or the old program, or no program at all (the control groups). This methodology can provide results that are more definitive than those obtained through other techniques, because at the outset of the program a comparison is established between two groups of clients who are similar in all ways except the important one: only the treatment programs are varied.

The strategy outlined could provide an appropriate structural solution to the structural problem of unevaluated techniques and procedures, which at present distort and threaten the future of the medical care system in New Zealand. Two additional points should be emphasized. First, there is no suggestion that the test of effectiveness, as a basis for resource allocation, should be applied only to interventions newly proposed for public funding. Clearly, interventions already ensconced must be subjected to the same scrutiny. Moreover, a large proportion of established procedures probably would not meet these criteria and should therefore be excluded from public funding if New Zealand is ever to receive value for money for its human services. No matter how long the intervention or practice has been in existence, if it does not meet the criterion of effectiveness, determined on acceptable methodological grounds, then it should receive no further support through public funding. Second, there is no suggestion here that the criterion of effectiveness should be applied only to particular interventions, or to interventions proposed by particular groups. Any intervention, whether acupuncture, cardiothoracic surgery, psychiatry, transcendental meditation, chiropractic, or whatever, should be subject to the same basic criterion. A situation must be avoided where, as at present, double standards exist regarding the criteria to be met, depending on the power of interested groups proposing or supporting some intervention.

A Prescription for the Future

This paper has considered some aspects of medical technology in relation to several structural problems besetting New Zealand's medi-

cal care system, within the broader context of the country's ever-worsening fiscal crisis. Some may consider the situation so extreme that structural reform is unlikely, and social policy a vacuous activity. I am under no illusion that this "warts and all" view of the present state of the New Zealand economy and medical care system will be at all popular. But it is generally consistent with the position of the government's own Planning Council, whose various reports have not been greeted with tumultuous applause. It is of course part of my strategy to present a realistic (some would say pessimistic) view of the existing crisis. However, social policies that will help bring about structural change are more likely to follow from a heightened consciousness of the crisis than from the present blind optimism. With this in mind, I have outlined a strategy that holds some promise for the future. Although this paper discusses a particular structural problem—the expansion of unevaluated high technology as applied to medicine—it illustrates a broader strategy and a methodology applicable to many other problems and areas of social policy. Obviously, many important details remain to be considered. They have been deliberately omitted from this paper in an attempt to draw attention to several major problems and principles of resource allocation relative to health care in New Zealand and elsewhere. If there can be no general consensus on these, or perhaps some other set of general principles, then no purpose will be served here by filling in specifics.

It may be claimed, by those who oppose *any* structural change, that New Zealand simply does not have sufficient resources, or enough appropriately trained personnel, to undertake the basic health services research and planning necessary for effective social policies concerning the public health. Such a claim is obviously specious when viewed in relation to the magnitude of resources that would be released in only one area *if* the government was prepared to enact its own optimistic hospital bed guidelines. There are many other areas where substantial savings could be effected. Furthermore, to postpone any change by claiming that there are just not enough appropriately trained professionals is to remain blind to, and further frustrate, the considerable talent available in New Zealand.

From an expatriate's view, New Zealand appears to have a sufficient number of appropriately qualified or experienced professionals, in

enough of the relevant disciplines, strategically distributed in different arms of the health system and areas of the country, to take a first step toward structural change, perhaps along the lines of the 1974 White Paper (New Zealand Government Printer, 1974). New Zealand has professionals of international repute who, although sometimes overlooked in their own country, are second to none in their own fields of work. There are economists with interests in health in Otago, and in various centers in the North Island. The universities located at Auckland, Palmerston North, and Wellington have respected medical sociologists. There are a number of social epidemiologists of world stature in various locations. An innovative Corporate Planning Unit has been established in Wellington and is already providing a model for other hospital boards throughout the country. Excellent policy-relevant research and planning are already under way in the Department of Health's own Management Services and Research Unit. People with a broader vision of the problems and what is possible are located in Treasury, the Planning Council, the Department of Statistics, etc. A unique data base is available through the National Center for Health Statistics. Some primary care physicians, dissatisfied with traditional modes of practice, appear willing to experiment with alternative ways of organizing and delivering health care. Many nurses are chafing at their present wastefully constricting roles, and seek an input into community health that is more consistent with their training. Some medical students are responding to improved teaching in epidemiology and community health and seem prepared to look beyond the traditional specialties. Some persons in the Department of Health have an excellent grasp of economic realities and desire to do things in a better way. Although still generalized, there is some desire among the public for an improved health care system. In sum, enough people, appropriately trained and located, desire some movement.

An opportunity has now presented itself of which immediate advantage should, if possible, be taken. However, whether all these factors can bring about change depends, perhaps more than on anything else, on the caliber of the country's political leadership over the next few years, and the pressure that an informed public is able to bring to bear on that leadership. Very generally, there are two alternative paths along which the government may attempt to travel. One course

(perhaps the easiest) is for the government to "kick for touch" and attempt to muddle through, by attempting to continue as before in the hope that enough people will be placated for the present government to be returned in three years. Should the minister of health decide (or be permitted by the Opposition) to simply "mind the store" over the next few years, then the structural problems already described will be further exacerbated. A second and more difficult course is for the government to begin an agenda of social reform based on some appreciation of the sorts of issues and principles outlined in this paper. Marc Lalonde (1977) chose this course while he was minister of health in Canada. Were it not for New Zealand's present fiscal crisis, the government would probably continue to play safe and choose the first alternative. But for reasons already discussed, this choice is no longer possible.

References

Adler, M.W. 1978. Randomized Trial of Early Discharge for Inguinal Hernia and Varicose Veins. *Journal of Epidemiology and Community Health* 32:136–142.

Alford, R.R. 1975. *Health Care Politics.* Chicago: University of Chicago Press.

Banta, H.D., and Thacker, S.B. 1979. Electronic Fetal Monitoring: Is It of Benefit? *Birth and Family Journal* 6:237–269.

Beresford, S.A.A., et al. 1978. Varicose Veins: A Comparison of Surgery and Injection/Compression Sclerotherapy (Five-Year Follow-up). *Lancet* 1:921–924.

Bradford-Hill, A. 1963. Medical Ethics and Controlled Trials. *British Medical Journal,* April 20:1043–1049.

Bunker, J.P., Barnes, B.A., and Mosteller, F., eds. 1977. *Costs, Risks and Benefits of Surgery.* New York: Oxford University Press.

Burnip, R., et al. 1976. Well-Child Care by Pediatric Nurse Practitioners in a Large Group Practice. *Journal of Diseases of Children* 130:51–59.

Chambers, L.W., and West, A.E. 1978. The St. John's Randomized Trials of the Family Practice Nurse: Health Outcomes of Patients. *International Journal of Epidemiology* 7:153–161.

Chant, A.D.B., et al. 1972. Varicose Veins: A Comparison of Surgery and Injection/Compression Sclerotherapy. *Lancet* 2:1188–1191.

Cochrane, A.L., St. Leger, A.S., and Moore, F. 1978. Health Service "Input" and Mortality "Output" in Developed Countries. *Journal of Epidemiology and Community Health* 32:200–205.

Department of Health. 1977. *Planning Guidelines for Hospital Beds and Services.* Wellington, New Zealand.

Department of Statistics. 1978. *Report of Family Statistics in New Zealand.* Wellington, New Zealand.

Harpur, J.E., et al. 1971. Controlled Trial of Early Mobilization from Hospital in Uncomplicated Myocardial Infarction. *Lancet* 2:1331–1334.

Hill, J.D. 1978. A Randomized Trial of Home-versus-Hospital Management for Patients with Suspected Myocardial Infarction. *Lancet* 1:837–841.

Hutter, A.M. 1973. Early Hospital Discharge after Myocardial Infarction. *New England Journal of Medicine* 288:1141–1144.

Illich, I. 1976. *Medical Nemesis: The Expropriation of Health.* New York: Pantheon.

Lalonde, M. 1974. *Nouvelle Perspective de la Santé de Canadiens.* Ottawa: Ministère Fédéral de la Santé et du Bien-être Social.

Lewis, C.E., et al. 1969. Activities, Events and Outcomes in Ambulatory Patient Care. *New England Journal of Medicine* 280:645–649.

Mather, H.A., et al. 1976. A Comparison between Home and Hospital Care for Patients. *British Medical Journal* 1:925–929.

Mathur, U.S., et al. 1975. Surgical Treatment for Stable Angina Pectoris. *New England Journal of Medicine* 292:709–713.

McKeown, T. 1976. *The Modern Rise of Population.* London: Edward Arnold.

McKinlay, J.B. 1977. The Business of Good Doctoring or Doctoring as Good Business: Reflections on Freidson's View of the Medical Game. *International Journal of Health Services* 7:459–488.

———. 1978a. A Confinement of Nonoptions: The Subordination of the Modern State through the International Debt Crisis. Unpublished paper, Department of Sociology, Boston University.

———. 1978b. A Note on Associations between Medical Care Input and Mortality Outcomes: Some International Comparisons. Unpublished paper, Department of Sociology, Boston University.

———. 1978c. On the Medical-Industrial Complex. *Monthly Review* 30:38–42.

———. 1979a. Epidemiological and Political Determinants of Social Politics Regarding the Public Health. *Social Science and Medicine* 13:541–558.

———. 1979b. The Decline of the House of Medicine. *Business and Society Review* No. 30 (Summer):55–61.

McKinlay, S.M. 1976. The Design and Analysis of the Observational Study: A Review. *Journal of the American Statistical Association* 70:503–523.

———, and McKinlay, J.B. 1979. Examining Trends in the Nation's Health. Paper presented to the American Public Health Association, New York, November 7.

Murphy, M.L., et al. 1977. Treatment of Chronic Stable Angina. *New England Journal of Medicine* 238:1259–1262.

New Zealand Government Printer. 1974. *A Health Service for New Zealand* (White Paper). Wellington, New Zealand.

———. 1979. *The Welfare State: Social Policies in the 1980s.* Wellington, New Zealand.

New Zealand Planning Council. 1978. *Planning Perspectives: 1978–83.* Wellington, New Zealand.

Roemer, M. 1961. Bed Supply and Hospital Utilization: An Experiment. *Hospitals (Journal of the American Hospital Association)* 35:36–42.

Salmond, G.C. 1978. *Medical Manpower Planning.* Wellington: Management Services and Research Unit, Department of Health, New Zealand Government.

Schlesinger, E.R., et al. 1973. A Controlled Test of the Use of Registered Nurses for Prenatal Care. *Health Services Reports* 88:400–410.

Spitzer, W.O., et al. 1974. The Burlington Randomized Trial of the Nurse Practitioner. *New England Journal of Medicine* 290:231–256.

United States Foreign Economic Policy Subcommittee. 1977. *International Debt, the Banks and U.S. Foreign Policy.* Committee on Foreign Relations, Washington, D.C.: U.S. Senate.

Waitzkin, H. 1979. A Marxian Interpretation of the Growth and Development of Coronary Care Technology. *American Journal of Public Health* 69:1260–1268.

Acknowledgments: Much of the background research for this report was undertaken while the author was a consultant to the Department of Health (New Zealand Government) and visiting professor of community health at the Wellington Clinical School of Medicine (Otago University). Particular thanks go to colleagues Dr. George Salmond, Department of Health, and Professor Ken Newell, Wellington Clinical School. I am also grateful for the help of

Mr. Ted Clark, Ms. Jan Dowland, and Messrs. Andrew Smith and Warrick Brunton.

Address correspondence to: Dr. John B. McKinlay, Department of Sociology, Boston University, 96–100 Cummington Street, Boston, Massachusetts 02215.