VARIATIONS IN PREPAID GROUP PRACTICE:
THE EFFECT OF ORGANIZATIONAL DIFFERENCES ON MEDICAL CARE OUTPUTS

by
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In recent years, much discussion in the medical care
field has centered around prepaid group practice. Some benefits
of prepaid group practice over solo fee-for-service practice
have been well documented. Enrolled populations in prepaid
groups, compared to similar populations receiving solo fee-for
service medical care, have lower costs, less optional surgery
and fewer inpatient days.

Few studies have considered the various forms of
prepaid group practices, focussing instead on comparisons to
solo fee-for-service practice. A need presently exists to
compare the different models of prepaid group practice to
determine which maximizes the benefits. The Health Insurance
Plan of Greater New York, a health plan contracting with thirty
medical groups in the metropolitan New York area, offers an
excellent oppotunity for comparative research into the effects
of organizational differences on medical care in prepaid group
practice. This study assesses the effect of such factors as the
full-time commitment of physicians or the use of centralized
group facilities on such output measures as the medical groups'.orientation to preventive care and health maintenance, and
consumer and provider satisfaction.

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INTRODUCTION

Once, the description of the "kindly old family doctor, with his big heart and little black bag, part healer, part priest, part family counselor" was appropriate. Today, the role and the corresponding image of the doctor have no doubt changed. The doctor is usually viewed as a hospital based scientist, his big heart and little black bag secondary to complicated equipment, miracle drugs and scientific language. While a great deal of that change must be attributed to advances in the technology of medical science, new arrangements in the organization and financing of practice cannot be neglected as an important factor.

One innovation in the organization and financing of medical care, pre-paid group practice, is of particular importance. This form of medical practice, recognized as an organized, comprehensive coordinated and economical method of delivering health care services provides medical care to three and a half million people throughout the United States. The major interest in pre-paid group practice has focussed on certain outputs—cost, the types of services used, demanded and needed, and the use of preventive and early care services. This thesis deals with one aspect of those questions — the effect of varied types of organization on providers and consumers. In particular, it will test the importance of various components of the Kaiser Health Foundation's "genetic code" for the formation of a successful pre-paid group practice.

To examine these problems, there are three areas of concern which the thesis will attempt to synthesize. First is the changing
pattern of the delivery of health care services and prospects for
universal federal financing for health care. The second area is the
literature concerning evaluation of medical care including quality of
care and organizational comparisons. Third are those aspects of the
sociology of medicine which deal with the doctor-patient relationship,
social and cultural influences on the health care system and the effect
of organization of medical care on outputs and outcomes.
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Chapter I

Changes in the Organization and Financing of Medical Care

In the past century, significant changes have occurred in medical practice in this country. One important aspect of that change has been the development of a spectrum of organizational forms for the practice of medicine including solo and group practice. A second aspect has been the emergence of insurance as a means of payment for the cost of medical care. Efforts to coordinate innovation in the financing and organization of medical care have led to the development of prepaid group practice, a form of practice in which physicians organized into a medical group contract with consumers, through a health plan agency, to provide all health care services on a prepaid basis.

Changes in Organization

Today, the physician works in close contact with physicians and other health professionals in a variety of formal and informal arrangements. In contrast, the doctor of ancient days, and as recently as one hundred years ago, worked in a lonely, competitive environment. Typical of that situation was Greek medicine. From the Hippocratic writings we know that physicians were craftsmen who competed in the market and traveled alone from town to town seeking patients. Strangely by modern standards, competition between physicians was profuse. Whenever two physicians visited the same village they competed for individual patients. In addition to displaying their best diagnostic skills (a skill highly valued in Greek culture) the competing physicians might have dressed extravagantly, used perfumes or displayed fancy
surgical tools.

America's development as a frontier nation with a rugged individualistic spirit was reflected in its medical practice. Any form of practice in which the physician did not work alone was deemed unethical, an attitude which persisted even until this century. As late as 1932, the American Medical Association criticized non-solo practice as "medical soviets", claiming that group practice detracted from the ability of the physician to practice high quality medicine.

More recently, a spectrum of organizational levels have developed and most of the varied forms of medical practice have gained wide acceptance in the profession. Even the AMA offers sober advice on group practice to young physicians in its Group Practice Guidelines to Joining or Forming a Medical Group.

Some difficulties remain in enumerating the levels of organization which presently exist. Foremost as the semantic problem associated with group practice. Group practice is often identified as any sharing arrangement between physicians. A more accurate definition is "the application of medical services by three or more full-time physicians formally organized to provide medical care, consultation, diagnosis, and/or treatment through the joint use of equipment and personnel, and with income from medical practice distributed in accordance with methods previously determined by members of the group."

At one extreme of the organizational spectrum is the "lonely, all encompassing general practitioner", a rare commodity in today's medical market. The isolation of this physician can no longer be complete. Even if he has no hospital appointment, or runs his own hospital for
his own patients, he must refer a number of patients to specialists or other hospitals. While the majority of his practice is providing continuous home and office care, he must interrelate with other physicians, public agencies and insurance companies.

With the increase of medical knowledge and changes in technology, the physician cannot handle the entire spectrum of care required by his patients. As a result physicians are increasingly specializing or sub-specializing in an area of medical practice. A large number of these specialists are the internists and pediatricians who provide the bulk of primary care once performed by the solo general practitioner. A "network" exists in which physicians refer patients to particular doctors in other specialties. Some of this network is defined by hospital affiliations. In addition, physicians in the same specialties have devised coverage networks to accommodate the increased demand for night and weekend medical care, while assuring leisure time.

To formalize some of the benefits gained in intra-specialty networks, it is advantageous for several physicians to share an office suite. Then, office space, receptionists, telephone and business services can be shared economically in addition to simplify coverage arrangements. A variety of forms of organized practice can exist. An elderly physician can hire a young man on salary to handle the burden of a heavy practice. Several physicians could arrange to form a group on a peer basis and share the costs of running an office while maintaining separate billing for their
patients. In a more organized form which could be a legal partnership or a professional corporation, income could be shared by some formula relating to hours or sessions worked, patient encounters or some other variable.

These groups can provide benefits to the patient by grouping together specialists with different sub-specialties (for example, internists with sub-specialties in cardiology and endocrinology) and guaranteeing access to physicians during weekends and nights. However, their main purpose is to simplify the task of the physician and guarantee some leisure time.

Next in the spectrum is the medical arts building, a large building which houses the offices of many physicians as well as other health services including dentists, optometrists, drugs and a laboratory. Although little analysis has been done on these facilities, it is known that they range in size from just a few physicians on one floor to large centers housing more than a hundred doctors. The large offices tend to house the full range of medical care as well as other health services. One study has shown that physicians in the larger building tend "to refer a large proportion of patients to each other. Acquaintance on a common hospital staff often fostered these relationships."

The existence of a medical arts building does nothing to guarantee group or team practice, although there is the opportunity
for the physicians to interrelate through the contact they achieve within the facility. The primary purpose is to simplify the practice of medicine by offering physicians offices that are suited to their needs and placing certain business matters in the hands of a competent business manager. The advantage to the patient is the convenience of medical care in one building. He can receive primary care as well as specialty consultation and ancillary services within the confines of one building. In addition, coverage arrangements within the facility, with the possibility of a centralized telephone service, can simplify access to night and weekend care.

Next in the organizational spectrum of integration and coordination of care is hospital based ambulatory care in its various forms. Both the outpatient department and the emergency rooms of most hospitals represent loosely organized group practices in their staffing patterns. Many hospitals are attempting to organize their ambulatory care centers into full-fledged groups providing comprehensive care. Because of the continuity between inpatient and outpatient care provided in hospital based ambulatory care, it is possible that some of the coordinated practice necessary in inpatient care will be reflected in outpatient service.

When the care is highly coordinated, the physicians will be practicing in an actual group practice. Many arrangements are possible within the group model. Labor centers might require only
the part-time commitment of physicians in each of the major specialties. Some groups perform only diagnostic workups or multi-phasic screening to employee groups on an annual basis. Certain specialty groups, notably the Mayo Clinic, provide the full range of medical and surgical specialties. Physicians are full-time, share income and participate in education and research programs. The advantage to the physicians includes the opportunity to practice scientific medicine in a stable framework.

This completes the spectrum of organizational structures in which the physician may operate. He may practice on a solo, isolated basis; he may seek contact with other physicians through coverage of office sharing arrangements, or he may achieve a formal relationship with other physicians in his specialty or other specialties.

During recent decades, the trend has been away from the solo end of the spectrum towards combined and group practice. In 1932, only 239 medical groups with 1,466 doctors conformed to the Public Health Service's definition of group practice by sharing physical facilities, income and patient responsibilities. By 1946, there were 368 groups. By 1959, over 1,150 groups with 10,081 full-time physicians satisfied the definition. A recent American Medical Association study makes evident the rapid increase in the number of groups. The study found that 2,418 multi-specialty groups with 24,349 full-time and part-time physicians existed by 1969.

Beyond the actual number in groups, many physicians sense the advantage of combined practice. The Health Information Foundation-
National Opinion Research Center (HIF-NORC) survey revealed that while seventy percent of all family doctors were in solo practice, only forty-one percent preferred it to some type of combined practice.

A 1950 survey of the graduating class of 1935 indicated that 74% were in solo practice. In contrast, of the class of 1945, polled in 1954 only 47% were in solo practice. More recently, a NORC poll indicated that only 26% of medical students envision having a completely independent practice. Thirty-one percent wanted shared facilities, thirty percent group or partnership practice and the remainder wanted salaried jobs.

Most definitely, the shift is away from solo practice towards a variety of combined and group practices.

Changes in Financing

In the early days of medical history, personal medical care was a luxury afforded only by the royalty. To support the large cost of medical services, the crown usually reimbursed the physician on salary or fee-for-service. During the next thousand years, the growth of a wealthy middle class which was willing to purchase its own medical care encouraged the development and institutionalization of fee-for-service as the dominant mode of payment.

After the Middle Ages, the guilds which survived in European nations began to assume some social welfare functions. Acknowledging the fee-for-service medical care was beyond the reach of its members, the guilds sought to provide health care economically. They created
sick funds and contracted with local doctors using a variety of payment mechanisms — salary, capitation, and fee-for-service. The funds were relatively successful, but their lay dominance displeased many physicians. To return control to the hands of the professional, some doctors began their own pre-payment funds.

Germany, like many other European nations, developed a number of sick funds providing health care to large numbers of people. In 1883, Chancellor Otto von Bismarck enacted the first national health insurance law. Rather than creating a single, centrally administered, national fund, he sought to use existing resources. The existing funds became depositories for funds raised from equal taxes on workers and employees. The money was then used to guarantee comprehensive health care to almost all Germans. Today, all individuals below certain income levels are required to join a fund and others may join voluntarily.

Most other European nations have some type of National Health Insurance. Britain, an exception, tried a National Health Insurance scheme, and eventually adopted a National Health System. There, physicians are either on salary within hospitals, or on capitation to provide ambulatory care.

The history of medical care financing in this country has been dramatically different. Despite initial support from organized medicine for some type of national health coverage, the overwhelming spirit of American medicine has been opposed to federal financing and at times, private insurance. Consequently, no universal
national health insurance or system has developed in this country.

The earliest American use of insurance as a means of payment occurred in the mid 1800's. Employers understood that ill health amongst their employees would hamper production and sought to provide medical care for industrial health problems. Particularly critical were those industries which functioned in the wilderness, too far from the urban areas in which doctors were increasingly located. Thus, railroads, mining and lumbering projects often had a doctor whose responsibility was to provide health care to the workers. To finance the operation, the employer usually checked off a weekly sum from the payroll and payed the physician on salary. The first major plan, run by the Southern Pacific Railroad Company, was founded in 1868.

After 1900, a number of large firms established programs to provide both occupational and personal care. Some of these programs were open to the families of employees and others were even open to the community at large. Continuing the focus of medical care towards workers and their work-related disabilities, the state governments intervened, beginning in 1911, with the workmen's compensation laws to guarantee health care to employees injured on the job.

Despite the increasing tendency to finance health care through insurance, the medical societies persisted in their notion that the doctor-patient relationship was hampered through the risk-sharing concept of insurance. They strongly advocated direct
payment of medical care costs, and promised to provide care free of charge to the indigent. The first public outcry against this attitude came in 1927 from the Committee on the Cost of Medical Care, a commission headed by a former president of the AMA and staffed by numerous far-sighted individuals. Their recommendations strongly endorsed comprehensive insurance for health care.

Shortly thereafter, the first national health insurance proposal was placed before the Congress. The opposition of organized medicine (an an expensive and effective lobbying campaign) lead to its failure and the failure of the many subsequent proposals for federal financing of health care. In the place of federal intervention, the medical societies encouraged the development of private insurance, a form to which they had been opposed but which loomed less ominously than national health insurance.

The nation was unprepared at that time to provide health care with insurance dollars. A 1930 study of industrial medical care plans revealed that only one million out of thirty-five million workers in the nation were covered for health care beyond occupational disability, and half of these were in one industry, railroads. Soon thereafter, the first Blue Cross Plan, began at Baylor University Hospital in Texas. A group of teachers contracted with the hospital to pay monthly dues to the hospital in exchange for all inpatient services ordered by a physician. A community-based plan guaranteeing payment for services at any local hospital began soon thereafter in California. Since then insurance plans have been created to cover outpatient medical costs, surgical fees and more recently pharmacy and dental expenses.

Today, 181 million people in the United States are covered
by some form of inpatient hospitalization insurance. Of these, ninety three percent has some form of surgical coverage, 145 million had coverage for ambulatory doctor's fees and 78 million people carried some form of major medical coverage.

**The Development of Pre-paid Group Practice**

During the past hundred years, both the financing and organization of medical care in this country have undergone substantial changes. Financing has shifted from direct fee-for-service as the almost exclusive method of payment to insurance as a means of sharing the economic risk. The organization of medical care has similarly shifted, from the doctor practicing alone with little or no colleague interaction, to increased interaction and even group practice. Once the two precedents of insurance and group practice had been established separately, it was only a matter of time before a group of consumers offering their prepaid insurance dollars contracted with a number of physicians interested in providing their services as a group.

The first two of these ventures the Ross-Loos Clinic and the Elk City Cooperative came into existence in the late 1920's. In Elk City, Oklahoma, Dr. Michael Shadid proposed that a group of farmers form a health care cooperative similar in nature to the supply coops. Co-op shares would be purchasable for $50 which would entitle the member to health care at a reduced price. By guaranteeing a stable clientele and a source of capital, a new hospital could
be built and both family physicians and specialists could be drawn to the community.

While the idea was readily accepted by the lay members of the community, the medical society provided much opposition. Shadid lost his membership in the society, and therefore in the state and national organizations. Several times his licence to practice medicine was jeopardized, and other physicians who took the state licensing examination to join his staff faced unusual obstacles in passing. Only the forthright support of Governor William Murray and the Farmers Union enabled Shadid to succeed.

Shadid faced other obstacles. Practitioners and hospitals, vying for business, offered discounts on medical care, although not within the framework of a cooperative. This was followed by a period of rumors and wild charges against the Cooperative. The cooperative lost much of its membership and was revived only upon the completion of the new hospital. Then the initial discount concept seemed unreasonable and a dues schedule, entitling one to prepaid medical, surgical and laboratory work, was instituted. Despite a slow period of growth, the need to increase the capital membership charge to a more reasonable $100, and continued opposition from the Medical Society, the Cooperative survived and grew.

In 1929, the Ross-Loos Clinic of Los Angeles came into existence. Loos, a successful surgeon set off on a prolonged trip and sold his practice to Ross, a Canadian surgeon who had recently settled in L.A. After three years of travels, Loos returned to Los Angeles but under the terms of the sale, he could not begin a new practice. A representative
of the Department of Water and Power in Los Angeles approached Loos to organize a prepaid plan similar to the one available to employees of the Southern Pacific Railroad. Loos consulted Ross who agreed to sell back half of the practice. They jointly assumed responsibility for the health care of this employee group in addition to maintaining their private surgical practice.

The workers were to pay small amounts from their weekly salaries, or the employers from fringe benefits, from which the workers were entitled to needed health care. The guarantee of a stable income could lure physicians to practice in this plan particularly since medical salaries were approaching new lows. As the depression was approaching, the prospect of a stable income for physicians and guaranteed health care for consumers -- both employees and their families -- was very appealing. As Ross-Loos grew rapidly and gained favor throughout the community, it was not long before the medical society became outraged. After charges were filed against both doctors for advertising and soliciting patients through the publicity the clinic had received, Ross and Loos were expelled from the society without a defense. With their enrollees providing support, the doctors took their battle to the Judicial Council of the American Medical Association and were reinstated in the local society. Ross-Loos then continued to prosper in providing health care to employed groups.

The two relatively small groups marked the development of prepaid group practice as a means of providing health care. After
World War II, a corporation and a city organized what were to become the largest and most significant prepaid group practices. The Kaiser Health Foundation found its roots in the industrial projects performed by Kaiser Industries. To provide care to workers building an aqueduct in the Southern California desert, Henry Kaiser asked Dr. Sidney Garfield to join the project. When Garfield has trouble meeting the demands of his creditors, a Kaiser industrialist proposed that the workers pay in advance so that the doctor could have a stable source of income. To survive after the war the program was opened to the public and it grew rapidly. Today, six Permanente medical groups with more than 2,000 full-time physicians in all specialties provide comprehensive prepaid health care to over two million people. Almost all hospitalization occurs in hospitals owned and operated by the Kaiser Foundation.

During the same period, Mayor LaGuardia found himself dissatisfied with the health care offered to New York City employees. With financial assistance from several foundations, a system known as the Health Insurance Plan of Greater New York (HIP) was planned whereby city employees would be entitled to receive prepaid health care from one of the many medical groups organized throughout New York City. Only two years later, HIP serviced 200 thousand enrollees with its 700 physicians. Today, 1100 full-time and part-time physicians provide care to about 800,000 enrollees from many union and other groups. Hospitalization is handled in community hospitals and generally financed through Blue Cross.
Although each of these four prepaid group practices differs significantly in its basic structure, it is possible to describe a model into which the major plans fit. The first element is the consumer. The subscriber and his family enroll with the health plan agency, often as a member of an employee group or union.

Figure 1

Enrollment is handled through a health plan agency which keeps enrollment records, collects dues and contracts with a medical group and a hospital.

Figure 2

The medical group, usually a legal entity (either as a partnership or professional corporation), is comprised by a number of physicians. Some of these physicians provide primary medical care; others provide specialty and consulting services. To provide comprehensive medical care within the prepaid group, all but the most esoteric specialties
should be represented in the medical group. The medical group is payed by the health plan on a monthly basis either through salary or capitation. (In a similar organizational form known as the medical foundation, physicians payed by fee-for-service comprise the medical group).

Figure 3

The remaining component of the medical system is hospitals. Various arrangements can exist for the purchase of inpatient medical care through the health plan agency. Capitation payments to hospitals can be used when the prepaid group owns and operates
its own hospitals. Where community hospitals have been used, either because of legal barriers or the existence of abundant community facilities, Blue Cross or other indemnity fee-for-service payment mechanisms have been employed.

Figure 4

Through these components, the health plan guarantees to the enrollee that he will receive all necessary ambulatory and inpatient medical care. 40
FOOTNOTES


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Chapter II

Federal Intervention and a National Health Policy

Coupled with the significant changes in the organization and financing of medical care which have occurred in this country, the government, both federal, state and local has become increasingly involved in the health care delivery system. In addition to the traditional role of providing public health through sanitary engineering and the control of epidemics, the government is becoming increasingly involved in the provision of services to the indigent. Care is usually provided in municipal and voluntary hospitals and their outpatient departments or state mental health facilities. The share of the health care dollar paid by public funds has increased dramatically during the past fifty years. While in 1928, public funds represented only 14.1 percent of the health care dollar (of which a large percentage was devoted to public health programs) this had increased to 24.6 percent by 1958. It is estimated that in 1970, 40 percent of the total bill was paid by the government.

Many significant events in the increasing federal involvement in the financing of medical care came during the liberal period of the mid-1960's. With the passage of the 1966 Amendments to the Social Security Act, the Federal government was firmly committed as the financer of medical care for the medically indigent and the aged of all economic levels. Both these acts were aimed primarily at permitting their target populations to buy health care in the private market by using public funds.
The legislation encouraging the development of Neighborhood Health Centers had a different intent. While earlier legislation was primarily for financing services, the Neighborhood Health Center was concerned with reorganization of services for the poor. Comprehensive medical care services as well as social service and other ancillary services were to be provided under one roof. Although the facilities were financed by public funds, the primary emphasis was not on financing so much as on organization: how can services be organized so that the poor can receive accessible, continuous and comprehensive health care.

Despite the rather significant influx of health care dollars from the federal government, few people are convinced that the system has been improved for any segment of the population. There are "constant allegations of inadequate medical care, unfulfilled health needs, exorbitant rises in costs, galloping inflation and apparently widespread discontent with most medical institutions." The cost of medical care has been increasing at approximately twice the national inflation rate.

Two additional federal acts, the Comprehensive Health Planning Act and the Regional Medical Program, sought to deal with the crisis by rationalizing the process of the expansion of health facilities. Comprehensive Health Planning provided funds to state and local planning agencies to introduce management skills to health planning. The Regional Medical Program, intended to seek a cure for heart disease, stroke and cancer, devoted much of its funding to demonstration
programs in health care delivery. The limitations of these two can best be exposed by the preamble to the Comprehensive Health Planning Act. The closing line remarks that the act should proceed "without interference with existing patterns of private professional practice of medicine, dentistry and the related healing arts."

To cope with the health care crisis, as well as repairing some of the damage possibly done by these previous legislative acts, the federal government is actively discussing new legislation for health care delivery. Presently, six major proposals are in Congress to fund some type of National Health Insurance. In addition, a number of bills to encourage the development of Health Maintenance Organizations (a new federal title which included both prepaid group practice and the medical foundation) have been proposed. Inevitably, the involvement of the federal government in the financing and organization of health care services will favor one type of organization over another. For example, the tax preference given to physicians who incorporate will give a significant boost to organized group practice. However the insistence of the Federal government on fee-for-service reimbursement for certain populations -- the normally prepaid Kaiser system is reimbursed fee-for-service for Part A of Medicare -- is a hindrance. Prepaid group practices which, in the aggregate, substitute preventive and ambulatory care and health education for the more costly inpatient care, will undoubtedly suffer.

The formulation of legislation will be influenced by a number of factors. The American Medical Association, which maintains one of the largest lobbies in Congress, will actively campaign for a fee-for-service solo practice formulation. The Group Health Association of America and lobbyists for other organizations will favor other
concepts including prepaid group practice. Much of the solution will rest on politics, a system with little predictability. However, the outcome can possibly by influenced by factual evidence from comparisons of health care systems. For example, the Perrott studies showing lower use of hospital days for matched federal employees in prepaid group practices compared to Blue-Cross Blue-Shield gives strong credence to the argument for prepaid group practice. Similarly, the Report of the National Advisory Commission on Health Manpower on the Kaiser Health Foundation reports favorable economic data for Kaiser: the costs are lower in prepaid group practice and inflation has been running at one-half of the national health inflation pace. These and other significant benefits of prepaid group practice have been well-documented. However, prepaid group practice is not a monolithic structure and substantial differences exist between groups. The Kaiser Foundation uses only full-time physicians in all specialties while HIP has used both full-time and part-time physicians. Kaiser, the Group Health Cooperative of Puget Sound and several smaller prepaid groups own and operate their own hospitals; others such as HIP use community hospitals and either self-insure for hospitalization or purchase care through Blue Cross. Some prepaid groups reimburse their physician members on capitation while others hire doctors for the group on salary. In some prepaid groups, risk is shared between the medical group, the health plan and the hospital, providing certain incentives for the medical group to control
costs until it effects patient satisfaction or health levels; other
groups have no cost sharing. Some prepaid groups encourage individual,
direct family enrollement as a means of securing the committment of
the enrollee; other groups discourage individual enrollment and accept
mostly groups.

The outputs are also very varied. For example, hospitalization
days per thousand enrollees varies from 270 to 470 in major group
practice plans (with a range of 720 to 1370 in Blue Cross plans
for matched populations in the same areas). To attribute the
benefits of prepaid group practice to the system as a whole without
considering organizational differences is misleading when there is
such variation between different groups. Certain factors in the
organization and financing of care must be more important than others
in producing benefits and these should be considered in the development
of a federal policy towards prepaid group practice. Research in
this area has been lacking. With the exception of a study by Makover
comparing HIP groups to each other, no one has attempted to examine
the effects of the various organizational factors on outputs and
outcomes.

The need for research in this area of health care delivery is
significant. While the Health Maintenance Organization legislation
offered by Congressmen Rogers and Roy places virtually no restrictions
on the type of prepaid group practice or medical foundation which
can be created, some medical care experts have encouraged the development
of certain types of structures.

Saward, formerly the medical director of the Kaiser Permanente Medical Group in Portland, Oregon, has developed a genetic code of prepaid group practice. He claims "one cannot violate this code without the result being either a stillborn plan or a plan that will be defective in growth and maturity." The components of the code are:

1. Prepayment -- monthly, community rated dues
2. Group Practice -- full-time physicians, pooling income, paid by capitation, autonomous, self-governing
3. Medical Center -- integrated, hospital based ambulatory care
4. Voluntary enrollment -- all enrollees must be offered dual choice
5. Capitation payment -- to encourage health maintenance
6. Comprehensive coverage -- full-spectrum of services prepaid

Within the Health Insurance Plan of Greater New York, the only prepaid group in the country contracting with many medical groups in the same geographic area (thirty in the New York Metropolitan area) many variations of these components exist, and certain hypotheses about the effect of organizational differences can be tested. These variations include full-time versus part-time physicians, centralized and de-centralized medical facilities, capitation payment versus salary and close affiliation with one hospital versus the use of many community hospitals (HIP could not own and operate any hospitals until recently).

Within HIP, the effect of these and other variations can be tested by comparison of the medical groups. First however, the literature
on evaluation of medical care must be reviewed to provide a conceptual base for evaluation.
FOOTNOTES

1. Herman Miles Somers and Anne Ramsey Somers, Doctors, Patients and Health Insurance (Washington, Brookings Institution, 1961)

2. Anne Somers, Health Care in Transition: Directions for the Future (Chicago, Hospital Research and Educational Trust, 1971)

3. PL89-97

4. Economic Opportunity Act of 1964


6. A Report to the President on Medical Care Prices (Department of Health, Education and Welfare, February, 1967)

7. PL89-749

8. PL89-239

9. PL89-749 Comprehensive Health Planning and Public Health Service Amendments of 1965

10. The six proposals are:
    Kennedy Health Security, AMA Medicredit. Javits Plan,
    American Hospital Association Ameriplan, National Health Care Act- Health Insurance Association, Nixon Health Insurance Partnership Act

11. The three major proposals are:
    Rogers-Roy, Staggers, Kennedy


17. Herbert Klarman "Economic Research in Group Medicine" in New Horizons in Health Care (Winnipeg, Canada, First International Congress on Group Medicine, 1970)


22. Ibid.


24. HR11728 The Health Maintenance Organization Act of 1971


26. Ibid.
Chapter III

EVALUATION OF MEDICAL CARE

The recent government and consumer interest in health care services, as well as professional interest in assessing performance, has spawned a significant research effort in the quality of medical care in the past two decades. The literature is diverse and proposes a number of methodologies to evaluate different aspects of care. In order to place the methodology of this study in context, it is necessary to describe the different types of methodologies and outline several interesting and relevant cases.

To assess quality of care, one must have a conceptual basis of the definition of quality in medicine. The best known definition, the "Articles of Faith" by Lee and Jones, places an emphasis on scientific medicine, prevention, consumer-provider cooperation, treatment of the "whole" individual, patient-physician relationship, coordination between medical care and social services, comprehensive and coordinated care and accessibility of care to all of the people. Although this definition is too general to be of analytic use, most studies have focused on one or more of these criteria.

Outcome Ideally, the purpose of a health care system is to reduce both deaths and illness, so that one measure of quality should be the outcome of the care. Codman first proposed in 1914 that hospitals should assess their patient treatment annually by enumerating the patients who died, those who lived and the number of procedures and treatments.
In its crudest form, this method can be used to compare two national systems such as the British and the United States or the success of two hospitals in the treatment of a particular disease. However, here the methodology would have some serious flaws. Intervening variable such as the type of patient population, the stage of the illness at which the patient is hospitalized, the age or ethnicity or socio-economic status of the patients and other factors can seriously influence the results. To control for these problems, it would be necessary to use matched populations, or control for the variations in some other way.

More sophisticated studies control for these variables by choosing matched populations. Examples include the Perrott studies comparing hospital utilization rates for matched groups of federal employees covered under different health benefit plans. The results have indicated a consistently lower hospitalization rate for prepaid group practice when compared to the Blue Cross and indemnity insurance enrolled populations. In a study on death rates among the indigent aged in New York City, enrollees in a prepaid group were matched to a population seeking fee-for-service care. The enrolled population showed a lower death rate.

Despite the ability of matching to overcome some difficulties in the use of outcomes as a measure of quality of care, many problems remain. Most serious is the validity of outcome as the actual point of evaluation. In some cases, measurement of deaths may be misleading if death is not the typical endpoint of the illness. In studying cross-
sectional populations, using deaths as the criteria will tend to give negative results to the populations which have very young or very old distributions because that is where most deaths are found. Also, matching completely is impossible as it is difficult to consider all socio-economic, cultural, and possibly genetic factors, and the results of changes in outcome of care might not be visible for many decades. Finally, problems in the clarification of outcome may hamper studies. For example, the exact nature of a disease may not be clearcut, or concurrent disease may lead to the choice of one rather than the other.

In heart disease prompted by long-term diabetes which should be recorded as the cause of illness or death? Similarly, confusion can arise in a fatal accident caused by heart failure of the automobile driver; to which etiology should the cause of death be attributed?

These problems demonstrate limitations on the potential uses of outcome analysis.

Process The next level of evaluation is process, the service itself. This measurement rests "on the assumption that at any time and place there is a scientific consensus among widely acknowledged experts on what constitutes good high quality health service." The judgment is based upon such criteria as the completeness of information collected in a medical history, physical exam and laboratory tests; use of preventive services; coordination, availability and continuity of service and the justification of diagnosis and therapy from clinical evidence. Judgments are often less precise than in outcome as there is rarely complete agreement on treatments and methods of care even
amongst experts. To use this approach great care must be taken to specify these dimensions, values and standards of the care which one is examining.

Although process is different from outcomes, they overlap. The two are a continuum on a spectrum of care. Each point on that continuum is in itself both an outcome of the previous steps as well as a means to further ends. Health similarly is both an end, and a means to enjoy one's life.

**Quantity of Services**  A slight variation of the evaluation of process is the examination of the quantity of services provided. The assumption is that certain types of health services are beneficial to defined populations -- for example, electrocardiograms for males over age fifty -- and a high rate of provision of these services can be regarded as desirable. However, for a limited number of procedures mostly in elective surgery (particularly tonsillectomies and hysterectomies) a high rate might be taken as a negative indicator unless accompanied by a report on the amount of pathology discovered.

One use of this methodology is in determining what percentage of the population used medical services in a year. Avnet, in her study of the enrolled population of the Group Health Insurance, Inc., found that a significantly larger percentage of enrollees with high option coverage used services that in the low option group.

The methodology is also valuable in determining what portion of a target population received a preventive medical service or an
immunization, or in determining hospitalization rates, lengths of stay in a hospital or physician encounters per person per year.

Work Setting and Organization of Care A fourth approach involves assessment of the work setting and the organization of care assuming that work in a proper setting is likely to be of higher quality than in an inferior setting. Criteria could include the adequacy of physical facilities, the staffing patterns, fiscal organization, completeness of medical records and other resources such as hospital beds available in the community. The distinct advantage is the ready access and the clarity of the information. However, the relationship between structure and quality of care is not clearcut. It has been shown that providing an additional quantity of hospital beds in a community does not necessarily increase quality of care, although hospitalizations will increase to fill the new beds to their capacity. There are several potential uses of the methodology. For example, since a registered nurse is more qualified than an LPN, the staffing pattern of a hospital with RN's and LPN's could be a valid source of information provided one was not assessing cost-benefit.

Attitudes Finally, assessment could involve the attitudes of the
recipients. To link together quality of services and quantity, one seeks the perception of the recipient of the care. A high positive response is then associated with a perception of adequate quality and quantity. An example is the survey of the opinions and attitudes of British nationals before and after the introduction of the National Health Service. This methodology is generally acceptable for evaluating continuity, acceptability, accessibility, comprehensiveness and sensitivity of care. However, perceptions can often be based on irrational biases and quantification of results can be difficult.

Sources of Information

Clinical Records To assess the judgments made in the quality of care studies, it is necessary to collect information on the medical care systems. The largest source of information, as well as the one most frequently used, is the clinical record. Clinical records potentially contain a vast resource of information, including patient background and other personal information, medical history, physical and laboratory tests, and for each illness, symptoms, diagnosis and treatment.

Unfortunately, some major problems exist with the use of the medical record as an information source. The private office of the physician is often not accessible to the researcher, limiting his work to the very different and usually more complete in-patient records.
Even if access can be achieved some serious problems remain in the use of ambulatory records. There is some doubt as to the validity of important statements in the record. Interviews and observation can overcome some of the ambiguity of the research. However, nothing can rectify an incorrect laboratory finding. Lembke's hospital study found the true incidence of uterine hyperplasia to be between five and eight percent rather than sixty to sixty-five percent of uterine curettages reported by the hospital pathologist. These findings are of particular value if one is assessing the physician's performance in relation to the actual illness, rather than what has been determined through diagnostic work-ups.

There is also a question as to whether the record in itself is a valid record of the doctor patient relationship. Both Clute and Peterson report that records in general practice tend to be highly inadequate, although Clute claims that in general practice, "the lack of adequate records is not incompatible with practice of a good, or even an excellent quality." Rosenfeld attempted to sort out the effects of the recording mechanism from the quality of care by examining the reasons for the downrating of the evaluation of quality. He demonstrated that both reasons of recording and other factors that could not be attributed to recording, contributed to the change in ratings. This could have been supplemented by a comparison of recording in the wards, (where recording must be more routine to accommodate the different individuals in charge) and the private services of the same hospital.
Supplementing record reviews with other sources of information such as observation or interviews frequently allows one to make more valid judgements. In a study of length of stay in Michigan hospitals, it was found that in one-eighth of the cases examined the initial judgement was reconsidered after further information was obtained.26

A recent study by Kroeger et al. has found that records could be examined by physicians and highly trained non-physicians with very consistent results on quality of care.27 However, there is no way to assess the completeness of information on the records which were reviewed. In addition, the records were chosen from the New York State Society of Internal Medicine, a group of high specialization whose records could be expected to be more complete than most physicians. The most significant observation of this study is that it is necessary to survey only a few records because "the internal consistency in entering and omitting information was such that the six records proved adequate for our purposes."28

Utilization Data A second source of data is the statistical information compiled by various agencies. Governments and particularly public health departments have traditionally collected information on deaths and communicable diseases although the specific data such as causes of death is often invalid. Insurance companies accumulate information on rates of surgical procedures, in-patient days and ambulatory visits in the process of reimbursing their enrollees. Prepaid group
practices have provided one of the most important sources of utilization data for research purposes. Utilization data of physician encounters, hospital days, certain surgical procedures, immunizations and rates of certain diagnostic procedures have been recorded either routinely or in special studies. Data on the demography of the population has also been collected and special studies have provided additional valuable information.²⁹

Some limitations exist with the use of utilization data for research purposes. Rarely is enough data collected to associate the medical care with the outcomes of the population. Aggregate data on morbidity or mortality is difficult to understand in the absence of demographic data. Insurance companies have been unable for financial reasons to interpret the mass of data which has been accumulated. Prepaid group practice has accomplished the most significant research and several studies are reviewed in this chapter.

Observations Observations of the doctor-patient relationship by a well qualified physician can provide certain types of information. Although it has been speculated that the presence of an observer profoundly affects the behavior of a physician, several studies indicate that the physician returns quite rapidly to his normal function.³⁰ A significant problem does remain, however. The observer is only able to observe those activities of the physician which are discrete and explicit. When the physician knows much about the patient from previous contacts, the routine history and physical may become
unnecessary or is abridged significantly. In addition the observer perceives the events selectively according to his training and experience.31

Interviews Another informational source in interviews. If information on attitudes towards care or perceptions of quality or quantity of services are desired, these can often be found from the recipients themselves. Although technical quality cannot be judged from interviewing recipients, this method does provide other elements of quality, particularly the satisfaction of the patient with the care he is receiving.32

Clinical Examinations The final source of data is clinical examinations. To provide uniform judgements on symptoms and clinical findings, a clinical examination can be performed on a population group. The most frequent use of this methodology has been for the data collected from special screening programs. By establishing a uniform standard for a laboratory finding, it is possible to assess what percentage of a population has a certain illness.

Comparative Studies

Several studies in the past twenty years have applied one or more of these methodologies to a comparison of health care systems.

In an early study of the Health Insurance Plan of Greater New York, (H.I.P.), Densen, et.al.34,35 applied the traditional mortality methodology of quality of care to compare H.I.P. enrollees to the rest of the New York population. Their measure was the perinatal
mortality among infants delivered by H.I.P. enrollees. When they discovered a reduction in rate when compared to the rest of New York City, it raised the question of whether this could be attributed to H.I.P.'s group practice and pre-payment mechanisms or other factors. Could the variation be solely a function of the more intensive training of H.I.P. physicians, all of whom are board certified or qualified? Furthermore, the H.I.P. population is not strictly comparable to the New York population: there is a pre-selection of middle class employed individuals and their families which may exclude the high risk segments of the population.

The original study design was increased to accommodate these and other possibilities. It was found that H.I.P. enrollees had a lower rate when compared to populations whose care was provided by board-certified practitioners whose rate was lower in turn than for those cared for by non-specialists. To assess the affect of class differences, patients were classified according to the occupation of the father. In each occupational class, the white H.I.P. enrollees were found to have a lower perinatal mortality rate than the comparable patients treated by private board certified obstetricians. Thus, the aggregate variation in mortality rates could be attributed to both the specialty certification of the H.I.P. physicians and some other factor, possibly the group practice or prepayment mechanisms of H.I.P.

A second study compared the different medical groups of the Health Insurance Plan of Greater New York. The study attempted to
seek correlations between quality ratings and some organizational aspects of the twenty six medical groups affiliated with H.I.P. The method of evaluation was from the ambulatory records of the medical group. The records were examined for adequacy of recording medical information, the treatment regimen with respect to the symptoms, examination, history and diagnosis, the use of preventive procedures, the use of laboratory work-ups, and the performance of certain required procedures in the routine workups. A small number of records from each medical group were studied, and if necessary, supplemented with interviews of the physician whose records were being examined. The categories of records examined were health examinations, pediatric records, cancer patients, and patients presenting with gastro-intestinal problems.

When the records were rated according to a pre-determined scale, it was found that the scores fell into four general classes. The classes, ranging from well documented and complete records to poorly documented, fragmented and incomplete ones, were found to correlate highly with variations in organization. The groups which adhered closely to the minimum standards outlined by H.I.P. were found in the better classes. "Centralized physical facilities and adequate laboratories were found to be more characteristic of medical groups in the higher quality ratings." In addition, quality ratings correlated highly with years of training of the physicians, a finding confirmed in an earlier study by Ciocco, Hunt and Altman.
Another comparative study was done by Mildred Morehead who has done extensive work in the area of medical audits. As an evaluation of neighborhood health centers, she sought to compare these providers to a number of other sources of care including several group practices, health departments, Children's Bureau Programs, solo practitioners and Medical School Affiliated Hospital Outpatient departments.

A number of medical records of ambulatory care were chosen to satisfy the following conditions: the person had registered for care within the previous three years, he (she) was within certain age ranges, and the patient must have been seen three or more times within the past four months. A number of people then abstracted the records from each of the sources onto code sheets with appropriate categories. Each category was given a weight considered appropriate to its importance; for example in obstetrical care, a prenatal work-up was valued at half the total possible score, while in adult medicine, and history and physical each received one-fifth of the total score.

It was found that of the OPD's, the OEO centers and the group practices, the OEO centers exceeded in medicine, the OPD's in obstetrics, and the group practices in pediatrics. The health departments and Children's Bureau were best in their respective obstetrics and pediatrics programs. The solo physicians were found to have shockingly poor records ranging from 24 to 50 percent lower in average score. However, these results cannot be interpreted properly until further access is gained to the offices and records of private practitioners.
Little is known now about the completeness of records in ambulatory care although both Clute and Peterson have reported the prevailing inadequacy of recording in general practice.

A recently designed methodology to be used by the National Academy of Sciences develops the concept of "tracer diseases." The methodology is aimed at evaluating the effect of various arrangements of ambulatory care on urban populations by comparing data on patients, providers and clinical measure of health status. The recipients of care are screened for the presence of a disease that meets the following qualifications:

1. The functional impact on those affected should be significant
2. A tracer should be relatively well defined and easy to diagnose in both field and practice settings.
3. Prevalence rates should be high enough to permit the collection of adequate data from a limited population sample
4. The natural history of the condition should vary with utilization and effectiveness of medical care.
5. The techniques of medical management of the condition should be well defined for at least one of the following processes: prevention, diagnosis, treatment, and/or rehabilitation
6. The effects of nonmedical factors on the tracer should be understood

A group of medical consultants proposed fifteen potential tracer conditions, nine of which were eliminated because they did not satisfy one or more of the qualifications. The remaining six, otitis media (middle ear infection), visual disorders, cancer of the cervix, hypertension, anemia, and urinary tract infections,
readily fit the qualifications, despite some minor disagreement on objective criteria.

To apply the methodology to a pediatric population in Washington, D.C., the Academy chose a random sample of approximately one-fourth of the households in each of two catchment areas. The sample was stratified to include adequate representation of people seeking care from the various organized providers of medical care including the prepaid group practice. The female head of household was interviewed about medical utilization and social, economic and attitudinal aspects of the family. Then, all children were screened for three of the tracers, otitis media, anemia and visual disorders. The methodology also involves a study of a sample of providers in the catchment area.

Despite several methodological problems -- there is inherent difficulty in a white organization interviewing a population that is predominantly black, and providers are often acutely protective of someone "looking over the shoulder" -- this methodology provides potential for measuring the impact of health care from differently organized ambulatory care settings on specific and hopefully generalized medical conditions.
Discussion of Methodologies

From the description of existing methodologies for evaluation of medical care, it is possible to select the level of evaluation most acceptable for this study. The use of outcome measures in a comparative study of thirty medical groups would be highly undesirable. The population served by medical groups includes different percentages of the aged and indigent as well as varied mixtures of union and other group enrollees. To use outcome measures, it would be necessary to select carefully matched populations from each of the thirty medical groups. Clearly, it would be difficult to find comparable populations of sufficient magnitude in each medical group.

Process evaluation would also be quite difficult to use in a large comparative study such as this one. To collect sufficient data for a precise measurement of a medical group's process performance, it would be necessary to review and analyze a large number of records. In addition, process evaluation has inherent weaknesses including the need for great specificity in establishing standards for analysis.

A third level of evaluation is the work setting and organization of care. Variables describing organization have been chosen as the independent variables for this study to determine which in fact are desirable organizational characteristics.

The two remaining levels of evaluation are utilization data and attitudes. For a comparative study it is necessary to have precise
data which will show significant variation in different samples. Both utilization statistics and certain measures of attitudes provide data which can be utilized in a comparative study.
FOOTNOTES

1. Isadore Altman, A. Anderson, *Methodology in Evaluating the Quality of Medical Care: An Annotated Selected Bibliography* (Pittsburgh, University of Pittsburgh Press, 1962)


5. L. Lipworth, J. Lee, J. Morris, "Case Fatality in Teaching' and Non-Teaching Hospitals, 1956-69" *Medical Care* (1:71-76, April, 1963)


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26. T. Fitzpatrick "Character and Effectiveness of Hospital Use" in Walter McNerney, editor, Hospital and Medical Economics (Chicago, Hospital Research and Educational Trust, 1962)


28. Ibid., p.373


30. Barbara Brody, Joseph Stokes, "Use of Professional Time by Internists in Group and Solo Practice" Annals of Internal Medicine (Vol. 73, November, 1970, No.5)


33. Health Services Research Study, "Development of Methodology for Evaluation of Neighborhood Health Centers" (Washington, Institute of Medicine, National Academy of Sciences, February, 1972)


37. Ibid. p. 831


41. Peterson, Medical Care, Op.Cit.


43. Ibid.
CHAPTER IV

METHODOLOGY AND DATA SOURCE

The Health Insurance Plan of Greater New York, Inc. (HIP) is a health plan office contracting with thirty medical groups in the five boroughs of New York City and Nassau County. These medical groups are responsible for providing comprehensive medical and surgical benefits to 750,000 enrollees of whom 66% are city, state and federal employees and their dependents, 14% are labor union members, 7% are Medicare recipients and 11% are Medicaid recipients. Because HIP was not until recently permitted to own and operate its own hospitals, hospitalization takes place in a variety of New York metropolitan area hospitals. Enrollees are required to have Blue Cross or comparable inpatient insurance.

The thirty medical groups serve a population which is predominantly middle and lower-middle income workers and their families, enrolled through the place of employment. Since groups serve the geographic area in which they are located, they have different proportions of indigent and elderly enrollees and varied mixtures of union and other enrolled groups. In addition, great variations exist in the organization of the various medical groups. As one of the oldest prepaid group practices, HIP was not able to demand at its creation some of the organizational variables which it is now trying to implement, such as hospital-based ambulatory care provided by full-time physicians.

Although HIP has strongly encouraged the use of full-time physicians, great variations exist in different groups in the ratio
of full-time to part-time doctors. In addition, some HIP groups concentrate their hospitalization in one or two community hospitals, emulating the Kaiser hospital-based model, while other groups use a larger number of hospitals. Some groups provide almost all specialty care within the group while others contract with non-group physicians for a large percentage of services. Some groups keep the group center open all evenings and Saturday, increasing access to early care for their enrollees, while others open as few as two nights. Some groups use university hospitals extensively, others use hospitals with no medical school affiliation. Some groups provide almost all services to HIP enrollees in the group center, others provide a large number of services in the private offices of group physicians. While possibly undesirable in terms of optimizing the health care provided to enrollees, this great diversity in organization offers a researcher excellent opportunities for evaluating the organization of medical care.

Comparing an aggregate system such as HIP to another such as Kaiser can give only very limited conclusive evidence. Many of the variations in output or outcome can often be attributed to regional variations in resources or possibly even health status. In addition, the aggregate style of research gives one little insight into the relative importance of different organizational variables.

Comparative research into HIP medical groups can aid in identifying those organizational characteristics which are of great importance in developing a functioning, high-quality prepaid group practice. The effect of regional differences might still exist
in different areas of New York City such as variations in the access to hospital beds. However, in an area the size of New York, it can be expected that variations in the health status of different geographic populations of predominantly working families would be minimized, and can be controlled for, possibly through the use of a simple socio-economic indicator.

The method of analysis will be a regression, a mathematical tool which enables one to fit the least biased line or function to a series of data points.

The computer package used, the Statistical Package for the Social Sciences, permits stepwise multiple regression. Variables are entered into the regression successively in order of diminishing importance.

The independent variables chosen to describe the variations in the medical groups are organizational variables such as percent of service provided in the group center, the percent of services provided by partners or the enrollment of the medical group, and other variables describing the physicians in the medical group and the patient populations served. Dependent variables have been chosen to represent outputs rather than outcomes of care.

The source of data for the study has been the Office of Research and Statistics of HIP. In addition, the Administrative Survey directed by the Vice-President for Medical Affairs provided valuable information. The majority of data is collected from two sources. The Med 10 (Appendix I), is the record of the physician encounter including information on the patient, physicians, location and type of service.
The Med 4, a card printed by the health plan at the time of enrollment, is used by the medical group to determine eligibility of the enrollee. Much of the information from these sources, including enrollee name, age, sex, address and coverage is computerized and is used by the health plan office for research purposes. Certain information is compiled on a monthly and annual basis to determine financial reimbursement to the medical group and project for future planning.

Data for 1970 was used for most of the analysis since that is the most recent year for which data is relatively complete and available. Although both enrollees and physicians change over time, the basic composition and structure of the group, such as its use of full-time physicians or a centralized facility, has remained fairly constant. Thus, in the case of one set of variables, laboratory tests, where it was necessary to use data for 1969, the use of data for different years does not present major difficulties.

For one dependent variable, the attrition rate of physicians, the only data which exists is from a special study of the years 1960-1965. For this regression, four other variables were changed. Data for physician services per 100 enrollees and medical group enrollment for 1965 were included in the place of 1970 data. In addition, as neither Medicaid nor Medicare existed during that period, the enrollment of Medicare and Medicaid recipients has been excluded.
FOOTNOTES


2. "The Role of Prepaid Group Practice in Relieving the Medical Care Crisis" Harvard Law Review (Vol. 84, No.4, February, 1971)


CHAPTER V

DESCRIPTION OF DEPENDENT VARIABLES

An ideal dependent variable would measure, in some way, the effect of the medical care on the health status of the enrolled population. However, it would be extremely difficult to use either outcome or process measures for a comparative study of thirty medical groups. Outcome would require the use of carefully matched populations while process would necessitate the review of a large number of medical records by highly exact standards.

A more accessible set of variables could be output measures. Assuming that variations in the health of a population correlate highly with certain measures of the medical care received by that population, output measures can be used with a high degree of acceptibility. An example is the use of immunizations. If a health system immunized a large percentage of its target population against a disease prevalent in the community, it can be assumed that the service is of direct medical benefit to the population. Additional output measures might evaluate other desirable characteristics of the health system. For example, a medical group in which the turnover rate of physicians was high would be considered undesirable as it would be difficult to achieve continuity of care. Similarly, a high disenrollment rate of enrollees, in addition to indicating consumer dissatisfaction, might have substantial implications for health care.
Rate of Pap Smear per 100 Women, Aged 20+ Per Year

The Pap Smear, a vaginal smear, developed by Papanicolaou in 1943, is considered throughout the medical literature as a sensitive indicator for cervical cancer. The normal testing regimen calls for routine screening of all women over age 20 and all other sexually-active females. Typically, the literature calls for annual tests for all women at risk. Recently, in an effort to control the potential excess of laboratory work in a prepaid group, the medical board of the Columbia Health Plan, Columbia, Maryland, has revised the period of re-examination to five years after two negative screenings. In addition, some recent literature has questioned the productivity of Pap Smear for large scale screening. However, there still exists significant support for regular cervical cancer screening, and it is unlikely that many practicing physicians have adjusted their use of the procedure.

The smear, a simple preventive or diagnostic procedure, is performed on approximately forty-percent of all at-risk women enrolled in HIP in any given year. The range is from as low as 15% to as high as 52% in different medical groups. Both family physicians and obstetricians/gynecologists perform the simple procedure and the laboratory work is generally done at the HIP Centralized Laboratory. This simplifies the collection of uniform data by establishing one source in which data is counted.

Pap Smear was chosen as a typical indicator of the medical groups' orientation towards prevention and health maintenance rather
than crisis care. It is a well accepted procedure of high reliability, and until very recently considered to be of high productivity. It is done on a substantial portion of the population so that the influence of one particular physician will most likely not be apparent in the data. In addition, it is a procedure well-known to the public, and, except for the cultural barriers attached to such a personal procedure, is well accepted. Finally, Pap Smear is a screening device for cervical cancer which is one of the "tracer" diseases chosen for the National Academy of Science study because it is a representative and treatable disease. Thus, a high rate of Pap Smear can most likely be considered an indicator of a greater orientation towards preventive care.

Although a high rate of screening for cervical cancer is highly desirable, there has been some speculation that this rate does not have the desired implications of a preventive and health maintenance orientation. Freidson hypothesized from his study of the Montefiore Medical Group, an HIP group phased out of existence in 1969, that to accommodate the burden of patients not constrained by fee-at-point-of-service, physicians used laboratory tests excessively. The physician instead of devoting the time necessary to take a full history and order the proper laboratory work, uses a battery of laboratory tests. If this exists in other HIP groups, it is possible that a high rate of Pap Smears, while desirable as a screening device for cervical cancer, might not have the aforementioned positive implications.
To measure the effect of organization on other lab tests, some additional laboratory tests have been chosen as dependent variables. If in these, characteristics which are considered desirable such as a predominance of full-time physicians or a large percentage of services provided in the group center associate with a high rate of testing the results of Pap Smear variations need be reconsidered. The additional dependent variables which have been chosen are:

- Total laboratory tests per 100 enrollees per year
- Tissue exams per 100 enrollees per year
- Urine exams per 100 enrollees per year
- Glucose tolerance exams per 100 enrollees per year

The first gives a general indication of the influence of organization on the use of laboratory tests. The second and third, indicate the use of diagnostic procedures of general use. The final, glucose tolerance, is a specific test for diabetes mellitus. The even distribution of diabetes over the population, influenced predominantly by age, makes the test a valid comparative index, and a high rate, within limits, is most likely desirable.

Rate of Family Doctor Attrition

Continuity of medical care is considered a cornerstone of quality care. Access to one physician who can be considered a family doctor is one means to achieving that continuity of care particularly when the doctor can refer the patient freely to specialist care.
Conversely, if one cannot have a family physician who establishes a long-time relationships, it is difficult to establish continuity of care.

The rate of turnover of family physicians in a medical group thus influences the quality of care by influencing the continuity. While the continuity of specialty care is also desirable, the family physician as the provider of 45% of all physician encounters is of greater importance.

The rate of turnover has other implications. The satisfaction of the physician with the organization will be reflected in his decision to stay or leave. While the satisfaction of the provider has not often been considered of high priority in health services research, it would be hazardous to encourage the development of health care organizations which were not satisfactory to physicians.

In considering the data several problems exist. First is the small numbers of physicians who leave HIP after having become partners. Second, physicians may leave for a variety of reasons which have nothing to do with job satisfaction. However, data accumulated over a six year period offers a base of sufficient magnitude to be considered valid.

Completeness of Medical Records

In Clute's study of general practice in North Carolina, he concluded that "the lack of adequate records is not incompatible with practice of a good or even an excellent quality." In contrast, Weed and Graves claim great importance of the medical record in quality care. Graves states, "In the case of medicine, the word
'record' is misleading; it is not a discrete, separate, precise picture of the reality, medicine. The record is an integral part of that which shapes as much as it is shaped. It is a tool, the school of thought by which the physician intervenes in the natural history of events... The importance of the medical record is that it determines the very nature of medicine.12 While Clute's statement might be appropriate for North Carolina general practitioners who handle a broad spectrum of care with few specialist consultants, clearly the situation of group practice in an urbanized setting is different. Many physicians, not only the family physician, interact with a patient over a period of time. The major source of information regarding previous findings and history is the medical record.

Prepaid group practice offers an opportunity for the use of a unit record in which all physicians, primary care and specialty, enter their findings. By housing physicians in one facility and permitting freer access to consultation, information such as that conveyed by the unit medical record, can be readily dispensed. Thus, greater continuity of care can be achieved for the patient.

HIP emphasizes the importance of medical records, possibly a result of Makover's 1951 study.13 He found that the quality of medical records in a group correlated highly with adherence to the HIP minimum standards. To assess the completeness of medical records maintained by the group, one hundred records are reviewed annually for the following criteria:
1. complete history
2. physical with vital signs and body findings
3. diagnostic tests.

Groups are rated according to percentage of completeness and given supplemental capitation payment accordingly. The percentile bands of complete records are 50% or less, 50 to 60%, 70 to 80%, 80% or more.

**Dual Choice Loss Ratio**

One measure of the consumer's satisfaction with a product is his choice of physician, or his annual decision to re-enroll in a health benefit plan. Typically, employee groups are annually given the choice of continuing the type of health care coverage presently being received or choosing a second plan, if other options are available. Although some groups covered by indemnity insurance, such as Blue Cross-Blue Shield, are offered only that choice, most prepaid groups have guaranteed their enrollees an annual choice between the group and a fee-for-service indemnity plan. This eliminates the difficulties attached to having a captive population, and has probably done much to quell the medical societies' antagonism to prepaid group practice.

By offering dual choice to enrollees, it is expected that some enrollees will leave the plan for reasons other than loss of coverage (which could be a function of loss of job or moving from the New York area). Since a prepaid group which practices scientifically sound medicine and relates well to its enrollees (the two do not necessarily
go hand-in-hand) \textsuperscript{16} will probably have a lower transfer out rate, HIP provides supplemental capitation payment to groups whose transfer out rate (excluding persons who left the service area or lost their jobs) is 20\% less than the overall HIP rate. \textsuperscript{17}
FOOTNOTES


3. "Tests to be used in screening procedures" Columbia Health Plan, unpublished mimeograph

4. James Daly, "How Accurate is the Pap Test" Medical Times (Vol.99, pp.64-68, No.3, March, 1971)

5. Lester Breslow, "Early Case Finding, Treatment and Mortality from Cervix and Breast Cancer" Preventive Medicine (Vol. 1 No. 1-2, March, 1972)


10. Lawrence Weed, Medical Records, Medical Education, and Patient Care (Cleveland, The Press of Case Western Reserve University, 1969)


12. Ibid. p. 105


14. Health Insurance Plan of Greater New York, "Information for physicians interested in a prepaid group partnership practice with HIP affiliation" (February, 1971)
15. Judicial Council of the American Medical Association, Opinions and Reports (Chicago, American Medical Association, 1971)


CHAPTER VI

DESCRIPTION OF INDEPENDENT VARIABLES

The independent variables have been chosen to represent the varied types of organizational structures existing within HIP. Their focus is on the commitment secured from participating physicians and variations from the classic model proposed by Saward. In addition, control variables to separate the effect of organization from other factors affecting medical care, have been included. These variations include the type of population served by the medical group and characteristics of the physicians.

For certain organizational variables, clearcut directional hypotheses exist. For example, the percent of services provided by medical group partners or full-time physicians would be expected to associate with higher quality medical care. For other variables, either several or no directional hypotheses could exist. For example, extra hours which the medical group remains open might place burdens on physicians while increasing access to care. The relative effects of these two factors could be determined through the regression equation. In analyzing a variable for which no single directional hypothesis exists, a consistent favorable or unfavorable association between that variable and the output measures could imply a directional hypothesis. If the results are not consistent, the importance of that variable would be diminished.
Percent Services Provided by Full-time Bonus Doctors

One of the cornerstones of a successful prepaid group practice is the commitment of the participating physicians. To secure that commitment, it is highly desirable to have all physicians devoting all their medical practice to the group. Physicians treating both prepaid patients and private fee-for-service patients will inevitably feel conflict which could conceivably result in inferior care for the prepaid patients. The dissatisfied fee-for-service patient has more opportunity to choose another physician and thus exerts control over the physician. The prepaid patient, on the other hand, exchanges no fee-at-point-of-service with which to pressure the doctor.

To encourage physicians to assume a full-time commitment to the plan HIP offers substantial bonuses to physicians who satisfy certain criteria. These physicians must work a certain number of sessions and provide a minimum of 5,000 patient services in a year. Despite the incentive to offer services full-time through HIP, relatively few physicians have done so. In some groups none of the physicians are full-time bonus while it ranges to as high as 83%.

Percent Services Provided by Partners

Another component of the genetic code calls for the existence of an autonomous self-governing medical group comprising primary care and all specialties. Although it would be impossible to generate a sufficient workload to maintain full-time physicians in some very esoteric specialties, the committed involvement of all primary care
physicians and physicians in most of the major specialties would satisfy the code.

To provide these services which cannot be handled by its members, the group typically contracts with other physicians in the community. For a number of reasons, this is an undesirable situation and should be maintained at a minimum. Non-group members cannot be expected to participate in the group practice and will typically have less access to the easy consultation and unit record advantages claimed for prepaid group practice. The non-group physician, if he receives fee-for-service, does not have the same incentives to control service as the medical group which is restricted to its prepaid funds. On the other hand, if the physician receives salary for his time, his lack of direct responsibility to provide care to the population might affect the quality of care.

For these reasons, it is highly desirable to maximize the percent of services provided by partners of the medical group.

Percent of Services Provided in Group Center

In addition to securing the commitment of physicians in a prepaid group through full-time involvement and membership in a partnership agreement, it is important to provide as many services as possible in the group center, to achieve the claimed advantages of prepaid group practice. Under present HIP conditions, a physician who maintains a private practice typically keeps an office on the outside in which he sees his private patients. He then has the
option of seeing his HIP patients in either the group center or his private office. Conflict around priorities assigned to HIP and private patients, could conceivably hamper the care offered to HIP patients.

HIP strongly encourages the use of the group center for as much of both primary and specialty care as possible and provides supplemental capitation to groups which do so. The advantages of services provided in the group center, are fundamental to the concept of group practice. The patient is offered one-stop medical care. The physician has the opportunity to consult another physician readily within the same facility without an intervening financial barrier. In addition, the physician has access to the unit medical record which encourages continuity of care.

**Physician Services per 100 persons per year**

Few good measures exist as to the amount of medical care that an individual receives during a period of time. Simply counting the number of physicians encounters can be highly misleading when one considers the vast differences in time spent with an internist, a psychiatrist, a pediatrician and other specialists. However, in the absence of a better indicator, the rate of physician encounters has been accepted as a measure. From the National Health Survey,\(^5\) information exists about the average number of visits to a physician for populations served by different types of health care providers. Within prepaid group practice, the existence of a defined population
and a utilization data system has facilitated the collection of better information in this area. Within HIP, the number of encounters ranges from 3.20 to 6.01 per person per year. Although this variation probably reflects to some extent differences in length of encounter, an increased rate has been recognized by HIP as both a burden (physicians providing more services have additional work) and desirable (HIP offers groups supplemental capitation for a higher number of services per enrollees.)

While increased visits might be considered as desirable because they represent an increase in health care, the burdens which they place on physicians cannot be ignored.

The rate of physician encounters represents an intermediate output of a medical care system, depending on the type of enrollees and physicians, the health status of the population, access and other factors. Encounters also represents an input: it is controllable through the physicians' use of return visits and routine health examinations. Thus, it can be expected to influence each of the evaluation measures and must be considered as an organizational variable.

Percent of services provided in Obstetrics/Gynecology

HIP medical groups are required to provide medical care in all specialties. Obstetrics/gynecology, one of the major specialties provides approximately 6.6% of all physician services in the medical group. In the use of Pap Smear as an output variable,
care must be taken to separate out effects of different variables in interpretation of the measure. If a medical group chose to increase the rate at which it provided Pap Smears and thus hired an additional gynecologist whose primary purpose was to increase the screening rate for cervical cancer, an increase in that screening rate would indicate nothing more than an optimization of the measure. In the case of Pap Smears for which an increase in the measure leads to an additional sum of money for the group, the role of obstetrical services in the medical group must be carefully considered. The percentage of services provided by obstetricians/gynecologists varies from 3.9 to 10.9 and there is a positive correlation between this measure and the rate of Pap Smears ($r = 0.40$). Thus, variations in the rate of Pap Smear must be considered in a special light. If the rate is higher in certain groups, part of that variation might be attributed to the number of obstetrical services rather than a general group orientation to preventive medical care. However, it is also possible that the higher percentage of services provided by obstetricians/gynecologists represents an attitude on the part of the group towards the value of obstetrics/gynecology and thus, is more than simply an optimization of a measure.

**Percent of physicians aged 55+**

**Percent of physicians aged 65+**

Although the age of the physician is typically not considered an important factor in assessing health care, it must be considered
as a control in this study. A young physician is probably less sure of his work and will rely more heavily on the use of exact tools such as laboratory findings, rather than his intuition. Also, a younger physician has most likely not established a long term relationship with his patients and must rely more on the medical record than his memory for information. If information is missing, it could result in the physician's additional use of lab tests. In contrast, the younger physician has left training more recently. He can routinely accept procedures developed during recent years and is possibly more aware of the latest techniques available in medical care. Thus, younger physicians would appear more likely to use laboratory tests than their older counterparts.

Age takes on particular significance when considering rates of a procedure such as Pap Smear. Although considered by most physicians to be an excellent screening device for cervical cancer, it did not receive general acceptance in medical practice until possibly as late as the 1950's. Thus, an older physician, in addition to having known his patients longer and having more experience and confidence, might be less comfortable with routine use of the new procedure. The younger physician will have been trained in the routine use of Pap Smears, and his greater use, although desirable, does not necessarily indicate better medical care than that offered by the older physician.

In addition, differences in training might be expected to influence the physicians' use of medical records. Other aspects
of physicians, such as the ability of patients to relate to younger or older physicians, might also influence other output variables.

**Evening and Saturday Hours**

An important aspect of medical care is access to the physician. For large populations, particularly blue-collar employees, leaving work during the day to seek care from a physician for a non-emergency condition could imply the loss of several hours of needed wages. In many cases, deferring an attempt to seek care until the evening or Saturday is often a necessary fact of life.

HIP, aware of the occupational status of its enrollees, has taken the problem of after-hours medical care seriously. Medical groups are encouraged, through a supplemental capitation payment to provide primary care and specialty services during the evenings and Saturdays. Groups which open three evenings per week plus Saturday are eligible for the minimal supplemental fee, while groups which stay open four or five nights plus Saturday are entitled to larger sums.

To encourage health maintenance and preventive care, it is important that the patient seek services from the physician before his illness reaches an emergency level. No system which dealt only with emergency care and had little orientation towards prevention and health maintenance could be considered a good medical system. By the medical groups providing services during these extra hours, it is possible that there can be more opportunity for prevention and maintenance. On the other hand, a medical group policy forcing
physicians to work extra evenings and weekends, creates a pressure on the physicians which could lead to a deterioration of morale. Subsequently, the attrition rate of physicians could be high, or possibly the patients could be dissatisfied, resulting in a high turnover rate of enrollees.

Percent of hospitalization in one hospital

Percent of hospitalization in two hospitals

The Kaiser Health Foundation has committed itself to providing all inpatient care in hospitals owned and operated by the Foundation. Their reason is twofold. First, administrative control (e.g. costs), an essential feature of the plan, cannot be maintained in a non-Kaiser community hospital. Second, use of a Kaiser hospital with an attached ambulatory care center encourages group interaction in both inpatient and outpatient care, hopefully providing greater continuity and quality of care to the enrollees.

HIP, until 1969, could not legally own and operate a hospital, and the existence of attached ambulatory care centers and the consequent inpatient-outpatient continuity was not possible. However, HIP still recognized the desirability of concentration inpatient care in a limited number of hospitals and provides supplemental capitation to groups which implement this. Groups which hospitalize 80% in one or 90% of all cases in two hospitals satisfy the criteria. Still, many groups do not satisfy the criteria. Some hospitalize
as few as 27% of all cases in one hospital or 48% in two. Other groups concentrate as much as 99% in one hospital or 100% in two.

Hospital Auspices

All physicians consider affiliation with a university hospital, either as a member of the teaching staff, or an attending with hospitalization privileges, a prestigious opportunity. Patients similarly perceive care received from a university-affiliated hospital and its physicians desirable.

This attitude was reflected in HIP's recently terminated venture with the Montefiore Hospital, a prestigious community hospital in the Bronx affiliated with the Albert Einstein College of Medicine. HIP considered the direct affiliation of a medical group with a university hospital to be of high value.\textsuperscript{13,14}

In addition, HIP is interested in offering as much hospitalization as possible in university-affiliated hospitals, even without a formal group affiliation. To encourage the use of these hospitals, or in their place, hospitals offering approved residency programs, HIP provides supplemental capitation payments.\textsuperscript{15}

Unfortunately, the data for this variable is not as clean as would be desired. Groups would logically use hospitals which are in the vicinity of their group center and therefore accessible to both enrollees and physicians. For one group, considered by all other standards to be an excellent medical group, this means the use of one hospital which, although accredited, has neither a residency program nor a university affiliation. However, most other groups have access to more hospitals and the data can therefore be considered valid.
Percent of medical care provided in hospitals
Percent of medical care provided in nursing homes

Medical care can be provided in a number of different sites. Most physician encounters take place in the office of the physician. A limited number take place in locations outside of the office such as the home of the patient or a nursing home. The other major site is the hospital where all inpatient visits occur. Although the nature of a physician encounter in a hospital is typically different from that in the office, (it is shorter in time and much information which the physician might need, such as blood pressure or vital signs, is available from the charts), encounters in the hospital and the office are counted with equal weight. The percent of care provided in each of hospitals and nursing homes should be carefully assessed in evaluating the output measures. A group might hospitalize freely for diagnostic workups, shifting the need for lab tests from the medical group to the hospital and affecting some of the lab test measures. Other potential factors include a greater physician orientation to inpatient care, displeasing those enrollees who joined HIP for its outpatient coverage, or lesser inpatient coverage drawing the physician from the hospital and its "interesting cases".

Care in nursing homes must also be considered. As nursing home patients live sedentary lives and are often elderly, their health problems are clearly different from the rest of the population. In addition, the physician provides services in the nursing home, drawing him from the group center, and possibly decreasing access
to medical care for the remaining enrollees.

**Full-time equivalents, employees per 100 enrollees**

**Full-time employees as a percent of full-time equivalent employees**

**Registered nurses per 1000 enrollees**

**Licensed practical nurses per 1000 enrollees**

Before 1900, medicine was a physician intensive industry. For every physician in the country, there was fewer than one paramedical person to aide the physician in his duties. Today the use of paramedical employes has increased significantly. For every physician in practice, there are more than ten paramedical employees. For inpatient care, the ratio of paramedical employees to physicians is even higher.

It has been argued that the use of qualified paramedical employees can remove from the physician some of the very simple work capable of being handled by less well trained personnel, affording the doctor the opportunity to increase his workload. Yankauer's national survey of paramedical-physician ratios and workloads for solo and group pediatric practitioners suggests an important contribution by registered nurses. Other employees increase productivity minimally.

In HIP medical groups, there is a large variation in the number of employees hired by the group. Although most groups have a minimum of one registered nurse and several licensed practical nurses, the distribution of medical assistants, clerical and maintenance help is highly diverse. It is important to consider the
relative effects of a registered nurse and a practical nurse. In addition, it is necessary to assess the effects of full-time and part-time employees on each of the chosen variables.

Medical group enrollment

Some discussion appears in recent literature about the size of the enrolled population of a prepaid group practice. Whereas two years ago, an enrollment of 20,000 was considered minimal for an efficient and comprehensive prepaid group practice, the minimum suggested size has now grown to approximately 50,000. While these figures are merely speculative with regard to the effect of enrollment on operational problems, they do reflect such factors as the enrollment needed to support full-time physicians in some of the specialties and sub-specialties. In addition, the economics of scale has permitted researchers to assess the conflicting and contributory effects of bureaucratization and centralized purchasing.

The discussion of optimal and minimal group size has generally considered only prepaid group practices with a single medical group in a region rather than those plans contracting with several groups in a single region. HIP, which contracts with thirty medical groups in the same geographic region, faces similar although different problems. For example, it would be possible within HIP for specialists to work half-time in each of two medical groups. Each medical group would then have a physician who maintained no conflicting solo practice while not requiring the full-time commitment of that physician and the subsequent enrollment required to support his practice.
In addition, certain economies of scale might still be achieved by the much larger health plan.

In analyzing the effect of size on output measures, it would be desirable to fit the best curve rather than assuming a linear function. However, since five thousand enrollees is well below the minimal size mentioned in the literature (a group that size does not generate the need for full-time physicians in any specialties) and 60,000 enrollees is not much more than the guideline, the use of a linear function is acceptable. Although this analysis will not permit to conclude that a group of 20,000 or 30,000 enrollees optimizes the output measures, it permits one to see whether a group in either the 5,000 or 60,000 range is clearly undesirable.

Medicare Enrollment-Percent of Total Enrollment

Medicaid Enrollment-Percent of Total Enrollment

Under Titles 18 and 19 of the Amendments to the Social Security Acts passed in 1965, health care for the elderly and the indigent is financed by the federal government. HIP, in its commitment to the health needs of the New York City community sought to provide care to these populations on a capitation basis. Presently, of the 750,000 enrollees in HIP, seven percent are enrolled through Medicare and eleven percent through Medicaid.

In an analysis of the health care in prepaid group practice, it is important to consider the peculiar needs of these two populations, Medicare enrollees need considerably more, and probably different services than the rest of the population served by HIP.
The Medicaid population also represents a significant problem. Indigents, it has been speculated, have an orientation to crisis care rather than prevention and health maintenance. Early data from the Kaiser Portland-OEO demonstration project indicates that a similar poverty group tended to utilize more emergency services than the regular Kaiser enrollees. The use of outside services by these enrollees also acts as a barrier to their full integration into the group. Although their Medicaid eligibility cards are marked HIP and they are therefore not entitled to receive services at hospital out-patient departments, these enrollees have apparently persisted in their use of OPD's and emergency rooms. A study of Born and Bernstein indicates that for Medicaid enrollees of one HIP medical group, easy access to care at outside sources was permitted and both the hospitals and the city ignored the ineligibility of the enrollee.

The effect of these two populations on medical care in prepaid group practice must be carefully considered, both through direct and indirect effects.

Percent of enrollees - graduated or attended college

Percent of enrollees - graduated high school

Although the physician plays a major role in determining the amount and type of medical care received by the patient, the patient does exert control through his use of services. By seeking care at different points along the path of an illness, or seeking preventive care in the absence of a physiological problem, the patient determines to some extent the type and amount of service
which the physician will use.

In considering Pap Smears as an indicator of health care, it is important to consider the role of the enrollee in the use of that service. Certain groups of enrollees, particularly school teachers, are very aware of the importance of an annual Pap Smear, and thus demand that service of the physician in a routine visit. Other groups, for example Latin ethnics, find the Pap Smear procedure overly personal and discourage its use, although these groups may be at high risk for cervical cancer. Thus, some indicator of the type of population served by the medical group should be used to assess the impact of the enrolled population on the services. In the absence of a broad range of socio-economic indicators for the population, education attainment has been chosen. Although education does not permit one to assess the cultural problems attached to health care utilization, it is an efficient indicator of socio-economic status. A further indicator of socio-economic status of the group is the percentage of Medicaid enrollees, which has been introduced previously.

**Dual Choice Loss Ratio**

One of the prime concepts of pre-paid practice is a panel of physicians serving a stable enrolled population. To achieve continuity of care through enduring physician-patient relationships, it would be desirable to minimize the change of enrollees in the medical group. A high rate of change, in addition to reflecting dissatisfaction of the consumers with the health care they are
receiving, has major implications for the health care system. Continuity of care would certainly be disturbed through a high disenrollment and no opportunity would exist for the enduring relationships. Thus, a minimization of the loss of enrollees is a desirable characteristic.

Dual choice loss has previously been introduced as an outcome measure. In addition, its disruptive effect on the stability of the enrolled population requires that it be considered an input to the other evaluation measures.

Special programs run by the medical group

In addition to the normal, day-to-day practice of medicine, medical groups have a number of other involvements. One, research and teaching, takes place in affiliation with a number of medical schools in New York City. A second activity, of particular interest, is special programs run by the medical group. A special program is generally focussed upon increasing or improving the quality of medical care provided to either a subpopulation or the entire enrolled group. One program provided care to drug abusers in several medical groups. Adolescent programs in a few groups focus on the psycho-social difficulties of adolescents. The Incentive Reimbursement Program is providing innovative care to the elderly in several medical groups through the use of paramedics.

Although the effect of these special programs on the care provided by the medical group must be considered, certain problems exist in interpretation. Although a special program can possibly
be associated with higher quality medicine, the causality of the relationship is not clearcut. A medical group which provides higher quality care is possibly more likely to be aware of the deficiencies in the care it provides; at least it is more likely to take action upon this recognition.

Thus, the existence of a special program in a medical group cannot necessarily be explained as the cause of the improvement of medical care; rather it might be the function of the superiority of the physicians. Other variables, for example, the use of full-time or part-time physicians in the medical group can more logically have a causal effect on medical care.
Other Variables

Although the variables described thus far appear to describe much of the structural variation in the HIP medical groups, some characteristics are clearly lacking. One, the process of policy formation and implementation within the medical group, is of interest. In the literature some speculation exists about the proper relationship between the physicians in the medical group and the health plan or the consumers. Generally, the literature concludes that the best arrangement for the medical group is an autonomous legal partnership with income derived from capitation rather than salary. Although all present HIP groups fit that model (the defunct Montefiore group paid its physicians on salary and the medical group was "owned" by the hospital) internal variations exist within the groups. An executive committee makes much of the policy regarding the group. The composition of this committee, as well as its participatory nature, would be of great interest in an assessment of health care. An understanding of the various effects of democratic rule versus autocratic control over the physician is of importance in determining the most desirable structure for a prepaid group practice's medical group.

Unfortunately, it is impossible to include this variable in the analysis, since no data exists on the functioning of the different groups. Although the health plan possesses copies of the partnership agreements of the medical groups which outlines the selection process for the various boards, it would be impossible to assess their actual functioning from these descriptions. In the absence of a source
for this information, it has been omitted in the analysis.

In addition to the educational attainment of enrollees in the medical groups and the use of the Medicaid enrollment as an economic indicator, it would be desirable to include another indicator of the socio-economic breakdown of the population. However, neither religion nor income levels are available and must be omitted from the study.

One final variable, the involvement of consumers would be of interest in assessing the effects of consumers on medical care. Until very recently, HIP had no consumer boards for the medical groups. These new groups have not been in existence long enough to affect the data used in this study and are thus excluded. However, in analyzing data for subsequent years, the inclusion of consumers as a variable would be desirable.
FOOTNOTES


2. Health Insurance Plan of Greater New York, "Information for Physicians interested in a prepaid group practice partnership practice with HIP affiliation" (February, 1971)


4. Ibid.


8. Laman Gray, editor, Dysplasia, In-Situ and Micro-Invasive Carcinoma of the Cervix Uteri (Springfield, Charles Thomas, 1964)


11. "The Role of Prepaid Group Practice in Relieving the Medical Care Crisis" Harvard Law Review (Vol.84. No.4, February, 1971)


13. Anne Somers, Health Care in Transition: Directions for the Future (Chicago, Hospital Research and Educational Trust, 1971)


20. PL89-97


CHAPTER VI
ANALYSIS OF DATA

A regression analysis was performed for each of the eight dependent variables, the evaluation measures and the laboratory tests. For each of the evaluation measures, the table includes the regression beta coefficients (the normalized coefficient), the level of significance and the probability of random occurrence for each of the independent variables. For the laboratory tests, the results of the regressions are presented in Appendix II.

In each case, only variables significant at the five percent level are presented to minimize the inclusion of non-significant variables through normal distributions. As most of the variables are significant at better than the one percent level, this difficulty is further minimized. The equations which are presented are the regression steps in which the greatest number of significant variables were included. Further variables could be added to each regression but their inclusion decreased the significance of other variables and the overall significance of the regression.

In several cases, two related independent variables such as concentration of hospitalization in one or two hospitals or the percent of physicians over age fifty-five or sixty-five could be entered into the regression significantly. As it would be difficult to interpret these results particularly if the signs of the regression coefficients were conflicting, only the more
significant of the two variables was permitted to enter the regression.

A note of caution must be presented with regard to the utility of regression analysis. Through the intercorrelation of the independent variables, it is possible for spurious relationships to appear in either or both the regression or correlation coefficients. If one variable is highly intercorrelated with a second, two regressions, one using both variables and the other omitting one, might yield results with conflicting implications. In addition, if an independent variable is highly correlated with some parameter for which data has not been considered, it is possible that not controlling for the non-quantified variable can bias the regression results. Thus, the results of regression equations must be considered with a great deal of caution, particularly when changes appear between the signs of the correlation and regression coefficients.
Table 1
Rate of Pap Smear per 100 Women, Aged 20+, Per Year

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<th>Variable name</th>
<th>Beta</th>
<th>F</th>
<th>Significance</th>
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<td>Percent physicians aged 55+</td>
<td>-0.58</td>
<td>49.4</td>
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<td>Physician encounters per 100 enrollees</td>
<td>0.49</td>
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<tr>
<td>Registered nurse per 1000 enrollees</td>
<td>0.39</td>
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<td>Percent enrollees- graduated or attended college</td>
<td>0.35</td>
<td>26.8</td>
<td>0.001</td>
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<td>Dual choice loss</td>
<td>-0.49</td>
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<td>0.001</td>
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<td>Percent services by partners</td>
<td>0.28</td>
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<td>LPN's per 1000 enrollees</td>
<td>-0.29</td>
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<td>Percent services- full-time physicians</td>
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<td>Medical group enrollment</td>
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<td>16.0</td>
<td>0.01</td>
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<tr>
<td>Medicaid enrollment- percent of total</td>
<td>-0.27</td>
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<td>0.01</td>
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<tr>
<td>Percent services by ob/gyn</td>
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<td>Full-time employees- percent of total</td>
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<td>Percent services- group center</td>
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<tr>
<td>Full-time equivalent employees</td>
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### Table 2
Completeness of Medical Records

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<th>Variable name</th>
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<th>F</th>
<th>Significance</th>
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<tbody>
<tr>
<td>Full-time equivalent employees</td>
<td>1.44</td>
<td>38.9</td>
<td>0.001</td>
</tr>
<tr>
<td>Evening and Saturday hours</td>
<td>-0.92</td>
<td>28.1</td>
<td>0.001</td>
</tr>
<tr>
<td>LPN's per 1000 enrollees</td>
<td>-0.66</td>
<td>18.9</td>
<td>0.01</td>
</tr>
<tr>
<td>Percent hospitalization- one hospital</td>
<td>0.63</td>
<td>12.8</td>
<td>0.01</td>
</tr>
<tr>
<td>Medicaid enrollment- percent of total</td>
<td>0.65</td>
<td>12.6</td>
<td>0.01</td>
</tr>
<tr>
<td>Percent services- group center</td>
<td>-0.85</td>
<td>11.4</td>
<td>0.01</td>
</tr>
<tr>
<td>Registered nurses per 1000 enrollees</td>
<td>-0.49</td>
<td>11.3</td>
<td>0.01</td>
</tr>
<tr>
<td>Percent services- full-time physicians</td>
<td>0.62</td>
<td>10.0</td>
<td>0.02</td>
</tr>
<tr>
<td>Dual choice loss</td>
<td>-0.52</td>
<td>7.9</td>
<td>0.02</td>
</tr>
<tr>
<td>Hospital auspices</td>
<td>0.40</td>
<td>5.6</td>
<td>0.05</td>
</tr>
<tr>
<td>Physician encounters per 100 enrollees</td>
<td>0.40</td>
<td>5.1</td>
<td>0.05</td>
</tr>
<tr>
<td>Full-time employees- percent of total</td>
<td>N.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent services- partners</td>
<td>N.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent physicians aged 55+</td>
<td>N.S.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3  
Dual Choice Loss Ratio

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Beta</th>
<th>F</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare enrollment - percent of total</td>
<td>0.43</td>
<td>16.2</td>
<td>0.001</td>
</tr>
<tr>
<td>Percent services - nursing home</td>
<td>0.50</td>
<td>15.8</td>
<td>0.001</td>
</tr>
<tr>
<td>Full-time employees - percent of total</td>
<td>-0.45</td>
<td>13.1</td>
<td>0.01</td>
</tr>
<tr>
<td>LPN's per 1000 enrollees</td>
<td>-0.48</td>
<td>12.6</td>
<td>0.01</td>
</tr>
<tr>
<td>Percent enrollees - graduated high school</td>
<td>0.30</td>
<td>7.0</td>
<td>0.02</td>
</tr>
<tr>
<td>Percent services - full-time physicians</td>
<td>-0.27</td>
<td>6.2</td>
<td>0.05</td>
</tr>
<tr>
<td>Percent hospitalization - one hospital</td>
<td>-0.26</td>
<td>5.0</td>
<td>0.05</td>
</tr>
<tr>
<td>Percent services - partners</td>
<td>0.26</td>
<td>5.0</td>
<td>0.05</td>
</tr>
<tr>
<td>Evening and Saturday hours</td>
<td></td>
<td></td>
<td>N.S.</td>
</tr>
<tr>
<td>Variable name</td>
<td>Beta</td>
<td>F</td>
<td>Significance</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------</td>
<td>-----</td>
<td>--------------</td>
</tr>
<tr>
<td>Percent services- partners</td>
<td>-0.84</td>
<td>42.4</td>
<td>0.001</td>
</tr>
<tr>
<td>Dual choice loss</td>
<td>0.50</td>
<td>10.4</td>
<td>0.01</td>
</tr>
<tr>
<td>Full-time employees- percent of total</td>
<td>0.29</td>
<td>4.8</td>
<td>0.05</td>
</tr>
<tr>
<td>Percent services- full-time physicians</td>
<td></td>
<td></td>
<td>N.S.</td>
</tr>
<tr>
<td>Full-time equivalent employees</td>
<td></td>
<td></td>
<td>N.S.</td>
</tr>
<tr>
<td>Percent-hospitalization- one hospital</td>
<td></td>
<td></td>
<td>N.S.</td>
</tr>
<tr>
<td>Percent services in hospital</td>
<td></td>
<td></td>
<td>N.S.</td>
</tr>
</tbody>
</table>
CHAPTER VIII

DISCUSSION OF DATA

The regression equation presented in the previous chapter reveal that certain independent variables enter into several of the regressions with a high level of significance, some at the five percent level, most at one percent or better. The remaining organizational variables enter into only one regression significantly.

Table 5 displays in tabular form the significant variables for each of the evaluation measures. Table 6 displays the variables for laboratory tests. In addition, the sign of the regression coefficient is shown. Where the sign of the regression coefficient is different from the sign of the correlation coefficient and the correlation coefficient is greater than 0.25, an asterisk appears adjacent to the sign. These are the relationships which must be considered with extra caution because of the intercorrelation of associated variables.

Many of the variables which are significant in the Pap Smear testing rate do not appear in the regressions for laboratory tests, urine tests and tissue examinations. Thus, Freidson's hypothesis that a high rate of lab testing occurs in prepaid group practice cannot be used to question the importance of a high rate of Pap Smear usage.

The variables which are significant for lab tests, urine tests and tissue examinations (Appendix II, Tables 1-3) are in most cases variables for which no clearcut directional hypothesis exists. In this light, it would be difficult to conclude that either a high or low rate of lab testing would be desirable and the relationships between lab test variations and the independent variables have lessened evaluative significance. To simplify the presentation many of the relationships
involving these three dependent variables have been omitted from the narrative although the signs of the regression coefficients can be found in Table 6. Only those associations to these three lab tests which offer insight into the operation of a prepaid group practice have been discussed.

While lab tests, urine tests and tissue exams do not associate with strong directional variables, the glucose tolerance testing rate does. It would appear from these relationships (Appendix II, Table 4) that a high rate of glucose tolerance testing is desirable.

The three variables measuring the commitment of physicians to the medical group all enter into several of the regressions significantly.

**Percent services provided by partners**

A large percent of services provided by partners is associated with a high rate of Pap Smear testing and a low turnover of physicians from the medical group. In addition, it is associated with a high turnover of enrollees. The first two, the high Pap Smear rate and the low physician attrition are clearly desirable characteristics. The other association, between partners and dual choice loss, bears a different sign than has been speculated. There is strong evidence that services provided by partners should be more desirable to enrollees than those provided by contract physicians. The enrollee cannot influence the contract physician as he can the partner through his opportunity to disenroll. In addition, the contract physician cannot avail himself of the opportunities of group practice with its shared facilities, unit medical record, and easy access to consultation. Thus, the regression equation suggests a relationship
<table>
<thead>
<tr>
<th>Variable name</th>
<th>Pap Smear Testing Rate</th>
<th>Medical Record completeness</th>
<th>Physician Attrition Rate</th>
<th>Dual Choice Loss Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent services partners</td>
<td>+</td>
<td></td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Percent services- full-time physicians</td>
<td>-*</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent services- group center</td>
<td></td>
<td>-*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician encounters per 100 enrollees</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent services by ob/gyn</td>
<td>-*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent physicians aged 55+</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evening and Saturday hours</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent hospitalization- one hospital</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital auspices</td>
<td>+*</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent services- nursing homes</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Percent services in hospitals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time equivalent employees</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Full-time employees- percent of total</td>
<td>-</td>
<td></td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Registered nurses per 1000 enrollees</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPN's per 1000 enrollees</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical group enrollment</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicaid enrollment- percent of total</td>
<td>-</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Variable name</td>
<td>Pap Smear Testing Rate</td>
<td>Medical record completeness</td>
<td>Physician Attrition Rate</td>
<td>Dual Choice Loss</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>------------------------</td>
<td>-----------------------------</td>
<td>--------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Medicare enrollment- percent of total</td>
<td>-</td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Percent of enrollees- graduated high school</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Percent of enrollees- graduated or attended college</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual choice loss ratio</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>

**Key**
* - Regression coefficient bears a different sign from correlation coefficient
<table>
<thead>
<tr>
<th>Variable name</th>
<th>Total Lab Tests</th>
<th>Urine Tests</th>
<th>Tissue Examinations</th>
<th>Glucose Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent services- partners</td>
<td>-</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent services- full-time physicians</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Percent services- group center</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician encounters per 100 enrollees</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Percent physicians aged 55+</td>
<td>-</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Evening and Saturday hours</td>
<td>-</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Percent hospitalization- one hospital</td>
<td>+</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Hospital auspices</td>
<td>-</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Percent services- nursing homes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent services in hospitals</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time equivalent employees</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time employees- percent of total</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Registered nurse per 1000 enrollees</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>LPN's per 1000 enrollees</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable name</td>
<td>Total Lab Tests</td>
<td>Urine Tests</td>
<td>Tissue Examinations</td>
<td>Glucose Tolerance</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>-----------------</td>
<td>-------------</td>
<td>---------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Medical group enrollment</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Medicaid enrollment- percent of total</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Medicare enrollment- percent of total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of enrollees- graduated high school-</td>
<td></td>
<td></td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Percent of enrollees- graduated or attended college</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual choice loss ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
which appears illogical. It is possible that the intercorrelation of an associated, but non-quantified parameter, explains this relationship.

**Percent of services provided by full-time bonus physicians**

A large percentage of services provided by full-time bonus physicians is associated with a high completeness of medical records and a lower turnover of enrollees from the medical group. It is also associated with lower testing rates in total laboratory tests, urine tests and tissue examination. However, the glucose tolerance testing rate is higher with more full-time physicians. Finally, a high Pap Smear testing rate is associated with fewer full-time physicians.

The first two associations would appear to satisfy Saward's hypothesis towards the role of full-time physicians. The low testing rate for total tests, urine and tissue examinations is logical when considering the risk sharing financing which occurs within the group. By ordering excess lab tests, physicians would be forced to allocate a larger portion of their budget to lab services. Full-time bonus physicians, whose sole source of income is the medical group budget, would be less likely to abuse the use of lab tests as described by Freidson. The glucose tolerance tests, in contrast, is not a large scale screening device (it is done on less than one percent of the population) and a higher rate of testing (within limits) is probably desirable. Thus, the positive association between glucose tolerance testing rates and partners is favorable.

The remaining variable is the Pap Smear testing rate. The correlation between percent of services by full-time physicians, and
Pap Smears is positive. In contrast, the regression coefficient is negative. The sign of the regression coefficient is a function of the earlier introduction of another variable, the percent of physicians aged 55+. There is a strong negative correlation between older physicians and full-time physicians. Thus, both full-time physicians and younger physicians use more Pap Smears than their counterparts. Further research is necessary to determine whether age or full-time/part-time is the more important factor.

Percent of services provided in group center

A high percent of services in the group center is associated with less complete medical records which conflicts with the sign of the correlation coefficient. Since full-time employee equivalents is the most important variable in this regression and there is a high correlation between full-time equivalent employees and percent of services in the group center (r= 0.66), the linear regression model suggests an unlikely relationship between medical record completeness and services in the group center. Further research is necessary to determine which of the two factors - employees or services in the group center - is of more importance in the completeness of the medical records.

Other Variables

Other independent variables enter into one or more regressions significantly.

Physician encounters

The number of physicians encounters is significant in five of the eight regressions. There is an association
between an increase in physicians encounters and more Pap Smears and better medical records. In addition, there is a positive association between physician encounters and lab tests, urine tests and tissue exams. The first two are desirable associations. Two possible explanations exist for the remaining three associations. There could be a routine protocol for the use of lab tests for each patient visit, i.e. certain basic tests for all patients in their first visit for an illness. However, if the large number of physician encounters represents a burden to the group physicians, they could turn to laboratory tests to supplement the limited time given to the patient by themselves. Thus, a large number of tests would reflect Freidson's hypothesis about the excessive use of lab tests in prepaid group practice. Further inquiry is necessary to determine which of these two mechanisms explains the variation in the use of lab tests.

Percent of services provided by obstetrics/gynecology

This variable was considered in only one regression equation, the Pap Smear testing rate, and it entered significantly. The coefficient in the regression was negative, in contrast with the positive correlation coefficient, implying that groups with more obstetrics/gynecology services perform fewer services. Since gynecologists perform a large percent of Pap Smears (internists and family physicians also do Pap Smears) this association is clearly illogical. It exposes the weakness if the linear regression model through co-linearity of supposed independent variables.
Percent of physicians aged 55+

The percent of physicians aged fifty-five or older enters into both the Pap Smear and tissue exam regressions with negative coefficients. As speculated previously, this implies a smaller usage of lab tests by older physicians. Both positive and negative implications exist. The older physician is more experienced and might need fewer lab tests to confirm his diagnoses. However, he is possibly less acclimated to the use of procedures of recent development.

Evening and Saturday Hours

The number of extra evenings and Saturday hours which the medical group remains open enters into two regression equations. An increase in hours is associated with higher glucose tolerance testing, a desirable relationship. The completeness of medical records has a negative association with extra hours. The type of practice which occurs in medical groups during these extra hours could result in less complete records. Staffing of the group is minimal including both physicians and non-physicians. In addition, there is very limited access to medical records during those hours and the physician often does not have the opportunity to consult the record or enter his findings.

Percent of hospitalization in one hospital

The variable measuring concentration of hospitalization in one hospital enters into four regressions significantly. There is an association between high hospital concentration and both more complete medical records and lower dual-choice turnover. Both indicate that better groups concentrate hospitalization in few
facilities. The other two variables are total lab tests and tissue examinations. The association is positive for lab tests and negative for tissue exams. One possible explanation is that groups concentrating hospitalization in one hospital might be more apt to depend on the hospital pathologist for tissue exams. Lab tests, however, are required in much greater numbers and might be a burden for the hospital laboratory. In addition, the centralized HIP lab is capable of performing most lab tests quickly, efficiently, and at minimal cost.

**Hospital Auspices**

This variable, measuring the medical groups' usage of different types of hospitals enters into three regressions. Hospital auspices measured what percent of hospitalization occurs in each of three types of hospital: medical school affiliated, hospitals with residency programs and accredited community hospitals.

For the three regressions, the rate of Pap Smear, the completeness of medical records and rate of glucose tolerance testing, the association with hospital auspices is positive. Thus, using university hospitals or in their place hospitals having residency programs is associated with an increase in these measures of quality of medical care.

Although the regression coefficient between Pap Smears and hospital auspices is positive, the correlation coefficient is negative. This variable is not highly directional, so either community or university hospitals could possibly maximize the Pap Smear measure. Further research into this relationship is necessary.
Percent services provided in nursing home

Percent services provided in hospitals

Groups which provide more nursing home services have a higher dual choice loss rate. It is unlikely that the nursing home residents represent those people choosing to leave HIP. It is more likely that by offering medical care in a nursing home, the medical group is diverting attention from other enrollees. These enrollees perceive the lessened attention, are dissatisfied with their medical care and disenroll from HIP.

A large percent of services provided in hospitals is associated with a lower use of both total lab tests and urine tests. If the group tends to hospitalize patients freely for diagnostic workups which could be performed on an ambulatory basis, there would be a subsequent decline in the number of outpatient lab and urine tests. The burden could be shifted to the hospital and the expense assumed by Blue Cross rather than the medical group. In planning a prepaid group financing all inpatient and ambulatory care, it would be necessary to assess whether in fact the lower rate of outpatient lab testing is being replaced by more costly inpatient care.

Full-time employees

Full-time equivalent employees

These two variables enter into several regressions. More employees is associated with better medical records. This relationship could be the function of several mechanisms. The employees could be taking an active role in completing medical records, possibly
through transcribing or typing the doctor's notes. The employees
could also be handling menial tasks, leaving the physician free
to concentrate on the practice of high quality medicine. More
employees is also associated with fewer tissue examinations.
If the medical group uses more employees to ease its workload,
it is possible that fewer tissue exams would be required. In ad-
dition, the medical group has limited financial resources which
it must allocate between employee salaries, lab test costs, salaries
and other expenses. The use of additional employees might result
in a trade off of other expenses.

A high ratio of full-time to part-time employees is associated
with fewer Pap Smears, a higher physician turnover, and lower enrollee
loss. Two of these associations would imply the desirability of
part-time employees and one the desirability of full-time employees.
With such little consistency, it would be impossible to determine
the relative value of part-time and full-time employees.

Registered nurses
Licensed practical nurses

These two variables enter into many of the regressions sig-
nificantly. Both associate negatively with medical records. Pap
Smears associates positively with registered nurses although nega-
tively with practical nurses. A lower dual choice loss is associated
with more practical nurses. However, higher testing rates for
total lab tests, urine tests and glucose tolerance is associated with
more registered nurses.
The association between nurses and medical records have the same sign as the appropriate correlation coefficients. It appears that nurses do not aid in the medical groups ability to maintain higher quality medical records. The relationships between nurses and Pap Smears can be explained through the relative training of the two types of nurses. The more qualified registered nurse can assist the physician while he does the Pap Smear; in fact, a female is almost always present during gynecological exams. The practical nurse is less likely to become involved in this procedure. In addition, the registered nurse can draw blood and collect urine samples at her discretion, which is confirmed by the association between registered nurses and three lab test variables.

The relationship between practical nurse and dual choice loss has little significant implication.

Medical group enrollment

It was speculated that larger groups, because of their ability to require the full-time commitment of specialists, would provide better medical care. With respect to Pap Smear testing, the regression shows this to be true.

Medicaid enrollment

The Medicaid enrollment as a percentage of total group enrollment enters into several of the regressions significantly. The association between Medicaid enrollment and Pap Smear testing rates is negative. This implies, as predicted, that Medicaid enrollees
seek crisis service and receive fewer preventive care procedures. In addition, the underutilization of HIP by Medicaid enrollees could be a factor. There is a positive association between medical record completeness and Medicaid enrollment. Each medical group agreed to accept Medicaid enrollees from their respective communities. Groups with a greater orientation to the health needs of their community are likely to have larger Medicaid enrollments. Weed claims an association between the physician assuming responsibility for total medical care (and thus his orientation to the health needs of the community) and his use of high quality medical records. With this perspective, the association between medical records and Medicaid enrollment is logical.

**Medicare enrollment**

The Medicare enrollment of the medical group enters into two regressions significantly. A high Medicare enrollment is associated with a low Pap Smear testing rate. Although the age bracket 65-75 is one of the highest for cervical cancer, it is probable that physicians see little purpose or benefit in screening women with such a low life expectancy.

A high dual choice loss associates positively with Medicare enrollment. Since the actual turnover of Medicare enrollees is low, an indirect mechanism is necessary to explain this relationship. Medicare enrollees require many physician encounters and much in-patient care. It is possible that groups must devote substantial
extra time to these patients, and the non-Medicare enrollees perceive that their care is lessened by this extra attention to the special group. As a result, the non-Medicare enrollees are dissatisfied and disenroll from HIP.

Percent of enrollees - graduated high school

Percent of enrollees - entered or graduated college

Groups with more enrollees who have graduated from college receive more Pap Smears. As speculated previously, the association between education and orientation to preventive health care is expected. In addition, groups with more high school graduates have a higher enrollee turnover. While high school graduates might be more aware than non-graduates of the desirability of continuous health care, non-graduates are also less likely to be aware of deficiencies in their health care and exercise their option to leave HIP.

Dual choice turnover ratio

The loss of enrollees by the medical group enters into several regressions as an organizational variable. A low loss ratio is associated with more Pap Smears, better medical records and a lower physician attrition rate. All three are desirable relationships. The third, the association between physician and enrollee turnover is interesting. It implies that a system which is undesirable to enrollees is also undesirable to physicians producing a high turnover of both.

2. Lawrence Weed, Medical Records, Medical Education, and Patient Care (Cleveland, The Press of Case Western Reserve University, 1969)


4. Personal Communication from Dr. Ray Fink, Associate Director, Division of Research and Statistics, Health Insurance Plan of Greater New York
Chapter IX

CONCLUSIONS

An evaluation of different prepaid group practice models has been performed with respect to variations in organization, characteristics of the physicians and the types of patient populations served. For the four regressions, between seventy-one and ninety-eight percent of the variation in the evaluation measures can be explained through linear introduction of these variables and the regressions are significant at better than the one percent level.

The regressions reveal that certain of the organizational and demographic variables associate with particular measures of medical care outputs. The results indicate that some parameters— for example the percentage of services provided by full-time physicians, affiliation with a university hospital or large medical group enrollment— associate consistently with desirable output measures. Other parameters— for example, the ratio of full-time to part-time employees or the number of registered nurses employed by the medical group— enter into the regressions with conflicting implications. Thus, some of the variables have important implications in the organization of prepaid group practice while others can be considered less significant.
Evaluative Implications of Dependent Variables

A correlation matrix of the four evaluation measures (Table 7) reveals that these variables are highly independent. In reviewing the discussion of Chapters VII and VIII, it appears that the evaluation measures and some of the lab test variables associate with different groups of factors. Thus, it seems that each of the regression equations evaluates a different aspect of the medical care system.

Pap Smear testing is an outpatient procedure which theoretically should vary as a function of the type of physician, enrollees and the style of practice. In the regression it associates with several variables describing the physician including his commitment to the medical group and his age, parameters describing the patient population (dual choice turnover and educational attainment) and the type of practice (medical group enrollment—i.e. the role of specialists). While Pap Smears does associate with hospital auspices, this variable reflects the type of physician as much as his use of hospitals.

Medical record completeness, in contrast, would be expected to vary as a function of the physician, the style of practice and the hospital usage rather than the enrolled population. Thus, it is not surprising that such variables as services in the group center, employees
<table>
<thead>
<tr>
<th></th>
<th>Pap Smear testing rate</th>
<th>Medical record completeness</th>
<th>Physician attrition rate</th>
<th>Dual Choice Loss Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pap Smear testing rate</td>
<td>1.000</td>
<td>0.103</td>
<td>0.074</td>
<td>-0.154</td>
</tr>
<tr>
<td>Medical record completeness</td>
<td>0.103</td>
<td>1.000</td>
<td>0.042</td>
<td>-0.346</td>
</tr>
<tr>
<td>Physician attrition</td>
<td>0.074</td>
<td>0.042</td>
<td>1.000</td>
<td>0.033</td>
</tr>
<tr>
<td>Dual Choice Loss Ratio</td>
<td>-0.154</td>
<td>-0.346</td>
<td>0.033</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Table 7
Correlation Matrix
full-time physicians or hospital concentration enter into the regression significantly. The role of Medicaid enrollment in medical records is probably the function of an indirect mechanism presented previously. Entry of the dual choice variable is not surprising since dual choice loss represents both an input and output of the medical care system.

Only two variables, the role of partners and the dual choice loss, are important in the physician attrition rate. This would imply that the loss of physicians is primarily a function of the relationships between physicians. Where physicians do not enter into a partnership with the accompanying relationships, the system does not function well.

Dual choice loss represents the consumer's satisfaction with the medical care system and would be expected to associate with those factors which would most visibly influence the decision to enroll. One of these factors is access to a physician who is committed to serving a defined population. The entry of full-time physicians into the regression confirms this expectation. The Medicare enrollment and percent of services provided in nursing homes could be related factors. In providing the large amount of care needed by the elderly and those in nursing homes, the physician might be forced to decrease his attention to the remainder of the population
he is serving. The enrollees may perceive this lessened attention and disenroll. In addition, the association between higher education and more disenrollment indicates a greater perception of dissatisfaction among the more educated.

The laboratory variables are associated with fewer evaluative implications than the other measures. It is interesting to note however, that tissue exams, in light of its surgical nature, associates with several of the hospital variables. Glucose tolerance testing, in contrast, associates with variables assessing the style of practice such as extra hours, employees or the role of full-time physicians.

**Significant Organizational Variables**

The regression results appear highly consistent with the "genetic code" model for a prepaid group practice. The most significant of the variables is the role of full-time physicians. An increase in the percent of services provided by full-time physicians is consistently associated with improvements in medical care evaluation measures. In considering the conflicts which a non-full-time physician encounters between his group and solo practices, the positive implications of full-time commitment appear logical.

A low dual choice loss is also associated with better ratings in the evaluation measures. While
the loss also represents an output of the system, it can be expected to contribute to the other measures. Thus, if changes were implemented which resulted in the minimization of the dual choice loss, improvements in the other output measures could be expected.

An increase in the number of physician encounters consistently associates with increased measures of medical care as well as a higher use of lab tests. While the lab test usage might reflect the use of tests in relation to visits, the other associations are significant. An increase in the number of encounters probably reflects a greater use of return visits and routine health examinations. If data were available to compare the inpatient days per enrollees from each group (controlled for the distribution of the population) it is possible that the effects of these extra visits could be assessed.

It would be important to consider the relative cost of inpatient and ambulatory care. While inpatient costs per day have now reached $100 nationwide, the cost of ambulatory visits is an order of magnitude less.

The size of the medical group is significant although it enters into only one regression. The entry into only one regression is actually not unexpected. The other three variables would not be expected to associate with the role of specialists, except possibly medical record completeness. Even in medical records
the role of the specialist is the less important one. The family physician, because he is the link between the patient and the medical care system (within HIP, enrollees must be referred by a family physician before they can see a specialist) must assume responsibility for maintaining a complete medical record. The entry of medical group enrollment into Pap Smear testing indicates that the full-time commitment of specialists is desirable. The importance of the full-time commitment of primary care physicians has been discussed previously.

The type of enrollees in the medical group raises several issues. The association between education and Pap Smear rates suggests the importance of health education programs oriented towards preventive health care. Further information is needed to understand the associations between dual choice loss and both Medicare enrollment and nursing home care. If the high turnover is the result of the demands placed on physicians by caring for the elderly, the stability of the prepaid group is threatened. The need for a separate system of health care for the elderly might exist.

One final variable deserves discussion for its implications for health care delivery and research. Older physicians, it would appear from the regressions, do fewer Pap Smears. If this reflects a different,
although equally high quality style of practice for the older physician, the variable need only be considered a control for future studies. However, if the older physician is not involved in continuing education, he can readily be swamped by the knowledge explosion in medicine. Thus, a lower use of Pap Smears might reflect less acceptance of a relatively new procedure amongst older physicians.

Suggestions for Further Research

In several of the regressions, the regression coefficient conflicts with the correlation coefficient. Two of these contradictions are involved in associations assessing the effect of the commitment of physicians to the medical group. These and other relationships suggest the need for further research to refine and expand the hypotheses suggested in previous chapters.

To assess the role of full-time physicians in Pap Smear testing, it would be necessary to take all physicians in each of several age ranges and apply their Pap Smear testing rate to a regression analysis. Similar techniques can clarify the role of the group center in medical record completeness and partners in dual choice loss. The effects of co-linearity of supposed independent variables can be minimized.

Matched studies using only a few medical groups can also focus the hypotheses. By limiting the number
of variables for which one need control, it would be possible to simplify the interpretation of the regression results. Finally, the need for better variables is significant. New variables are needed to assess the socio-economic distribution of the population, the commitment of physicians to the medical group and the relative value of different employees.

Controlled experimentation can also be of assistance. The effect of a new program on medical care outputs could be assessed rather simply by measuring before and after the program’s introduction and controlling for changes which may have occurred in the interim. Other experimental changes can be assessed using similar techniques. If one part-time physician were to leave HIP and another part-time physician within the system became full-time in his place, the effects of full-time physicians on the entire medical group could be assessed. These studies must be considered as having a major limitation. Much of the variation is probably a function of the particular physician rather than the organization in which he practices. Thus, variations in outcome cannot necessarily be ascribed to the organization of care.

Causal Models

In spite of the clarity of the directional hypotheses, the regressions determine no causal relationships between variables. While for some variables
it is possible to assume the existence of causal relationships— for example, a low Pap Smear rate associated with a high Medicaid enrollment would probably imply that Medicaid enrollees have little orientation to preventive care— for other variables, the existence of causal relationships cannot be assumed. In one variable, affiliation with university hospitals, a dynamic relationship is probable. To receive attending or admitting privileges at a university hospital, the physician must attain standards established by the hospital board. While a university-affiliated physician is therefore most likely of higher quality than his associates, the care which his patients will receive from the medical school staff is probably better. Thus, improvement in medical care is a function of two factors—the quality of the physician and the subsequent affiliation with the medical school hospitals.

The relationships developed from the regression equations and the subsequent hypotheses to explain these relationships confirm speculation about the varied prepaid group practice models. However, they do not establish a model which must be duplicated to create successful plans. It is possible that the better measures associated with certain organizational forms are not in reality a function of these forms. If better physicians were more highly aware of the organizational forms most suited to their type of practice, it is possible that they selected these forms over others. Then, it is not
necessarily true that placing other physicians in those organizations will permit them to perform equally well. A reminder to proceed with caution in the formation of prepaid group practices comes from Caldwell Esselstyn who says "the only thing worse than a bad doctor is a bad group of doctors". ³

The role of medical education must also be considered. The majority of teaching in medical schools occurs within the hospital. The minimal exposure to ambulatory care which students receive comes from the outpatient departments which bear little resemblance to practice in a prepaid group. The graduating physician has rarely been exposed to organization of medical care, treatment of a defined population or the realities of practice outside of the university hospital. ⁴ Thus, the difficulties of integrating physicians into a successful prepaid group practice cannot be ignored.

Summary

Determining the structures of medical practice in which the physician can perform best is an important issue both politically and medically. With increasing federal intervention in the financing and recently, the organization of medical care, and the tendency for physicians to practice in groups rather than alone, analysis of the varied forms of practice becomes critical. Prepaid
group practice, because it has proven itself as an economical and coordinated method for providing comprehensive health care, should be one of the first foci of research in this area.

This study assesses the effect of differences in organization, physicians and the enrolled population on output measures of care. It was found that within a prepaid group practice contracting with thirty medical groups in a single geographic area, the organizational characteristics included in the "genetic code" for prepaid group practice associate strongly with an improvement in medical care outputs. While these associations do not imply a causal relationship, they suggest which organizational characteristics should be considered in further research. Only through further research including individual correlations and controlled experimentation can the existence of causal relationships between organization and evaluation of care be determined.
FOOTNOTES

1. Ann Somers, Grand Rounds, Department of Community Medicine, Mt. Sinai School of Medicine, May 3, 1972


3. Caldwell Esselstyn, American Association of Medical Colleges, HMO Conference, New York Academy of Medicine, March 9, 1972

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APPENDIX I

HEALTH INSURANCE PLAN OF GREATER NEW YORK

FORM MED 10
H.I.P. PHYSICIAN VISIT REPORT (MED 10) - OUT OF HOSPITAL SERVICES

Please use No. 3 Pencil or Ball Point Pen in completing this form. Remove carbon before mailing.

<table>
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<tr>
<th>SHEET No.</th>
<th>OF __ SHEETS</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

**INSTRUCTIONS**

1. **Patient Identification**
   - Imprint; or, for patients without plastic plates, enter certificate number, name, birth data, contract number.

2. **Place of Service**
   - 0. Private Office
   - 1. Medical Center
   - 2. Patient's home
   - 4. Nursing Home

3. **Type of Service** - Enter number describing type of service.
   - 1. Routine physical check-up
   - 2. Other complete physical exam (not routine)
   - 3. Immunization only
   - 4. Surgical or medical procedure
   - 5. All other visits

4. **H.I.P. CODING SECTION**

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<th>AGED</th>
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<th>Med Group No.</th>
<th>Month</th>
<th>Year</th>
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<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
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**CERTIFICATE NO.**

**NAME**

**BIRTH DATA**

**CONTACT NO.**

**TYPE OF MEDICAL PROCEDURE (e.g. proctoscopy)**

**TENTATIVE OR FINAL DIAGNOSIS**
APPENDIX II

LABORATORY TEST REGRESSIONS
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<th>Variable name</th>
<th>Beta</th>
<th>F</th>
<th>Significance</th>
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<tr>
<td>Percent services in hospital</td>
<td>-0.70</td>
<td>23.9</td>
<td>0.001</td>
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<td>Physician encounters per 100 enrollees</td>
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<td>19.4</td>
<td>0.001</td>
</tr>
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<td>Percent enrollees- graduated high school</td>
<td>-0.47</td>
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<td>Registered nurses per 1000 enrollees</td>
<td>0.40</td>
<td>8.0</td>
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<tr>
<td>Percent hospitalization- one hospital</td>
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<td>7.2</td>
<td>0.02</td>
</tr>
<tr>
<td>Percent services- full-time physicians</td>
<td>-0.39</td>
<td>6.4</td>
<td>0.02</td>
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<tr>
<td>Medicaid enrollment- percent of total</td>
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</tr>
<tr>
<td>Percent services- nursing homes</td>
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Table 2
Urine Tests per 100 Enrollees per Year

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<td>Medicaid enrollment - percent of total</td>
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<td>21.3</td>
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<tr>
<td>Percent services - full-time physicians</td>
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<td>Registered nurses per 1000 enrollees</td>
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<td>11.7</td>
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<tr>
<td>Percent enrollees - graduated high school</td>
<td>-0.42</td>
<td>9.7</td>
<td>0.01</td>
</tr>
<tr>
<td>Percent services - partners</td>
<td>0.26</td>
<td>5.0</td>
<td>0.05</td>
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<td>Medical group enrollment</td>
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<tr>
<td>Percent hospitalization - one facility</td>
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<tr>
<td>Variable name</td>
<td>Beta</td>
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<tr>
<td>---------------------------------------------------</td>
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<tr>
<td>Physician encounters per 100 enrollees</td>
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<td>Percent services- group center</td>
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<td>Percent services- partners</td>
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<td>Full-time employees- percent of total</td>
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<td>0.05</td>
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<tr>
<td>Registered nurses</td>
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Table 4  
Glucose Tolerance Tests per 100 Enrollees Per Year

Degrees of freedom= 15  F= 4.3  R-Squared= 0.67  p < 0.02

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Beta</th>
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<th>Significance</th>
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<tr>
<td>Hospital auspices</td>
<td>0.69</td>
<td>15.1</td>
<td>0.01</td>
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<tr>
<td>Registered nurses per 1000 enrollees</td>
<td>0.54</td>
<td>7.7</td>
<td>0.02</td>
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<tr>
<td>Percent services- full-time physicians</td>
<td>0.39</td>
<td>4.7</td>
<td>0.05</td>
</tr>
<tr>
<td>Evening and Saturday hours</td>
<td>0.46</td>
<td>4.7</td>
<td>0.05</td>
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<tr>
<td>Full-time equivalent employees</td>
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<tr>
<td>Percent services- nursing home</td>
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<td>N.S.</td>
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<tr>
<td>Percent enrollees- graduated high school</td>
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APPENDIX III

MEANS, STANDARD DEVIATIONS AND CASES

INDEPENDENT AND DEPENDENT VARIABLES
### MEANS, STANDARD DEVIATIONS, AND CASES

#### INDEPENDENT AND DEPENDENT VARIABLES

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<th></th>
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<th>S.D.</th>
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</thead>
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<td>Percent of services- partners</td>
<td>75.37</td>
<td>14.52</td>
<td>30</td>
</tr>
<tr>
<td>Percent of services- full-time physicians</td>
<td>32.53</td>
<td>22.03</td>
<td>30</td>
</tr>
<tr>
<td>Percent of services- group center</td>
<td>77.69</td>
<td>14.99</td>
<td>30</td>
</tr>
<tr>
<td>Physician encounters per 100 enrollees</td>
<td>412.69</td>
<td>105.66</td>
<td>30</td>
</tr>
<tr>
<td>Percent services by ob/gyn</td>
<td>6.48</td>
<td>1.43</td>
<td>30</td>
</tr>
<tr>
<td>Percent physicians aged 55+</td>
<td>53.05</td>
<td>18.63</td>
<td>30</td>
</tr>
<tr>
<td>Percent physicians aged 65+</td>
<td>17.82</td>
<td>10.34</td>
<td>30</td>
</tr>
<tr>
<td>Evening and Saturday hours</td>
<td>2.43</td>
<td>1.41</td>
<td>30</td>
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<tr>
<td>Percent of hospitalization- one hosp.</td>
<td>53.24</td>
<td>23.63</td>
<td>30</td>
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<tr>
<td>Percent of hospitalization- two hosp.</td>
<td>73.02</td>
<td>16.44</td>
<td>30</td>
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<tr>
<td>Hospital auspices</td>
<td>1.96</td>
<td>0.54</td>
<td>30</td>
</tr>
<tr>
<td>Percent services- nursing homes</td>
<td>2.33</td>
<td>0.49</td>
<td>30</td>
</tr>
<tr>
<td>Percent services- hospital</td>
<td>10.46</td>
<td>3.90</td>
<td>30</td>
</tr>
<tr>
<td>Full-time equivalent employees/1000 enrollees</td>
<td>1.67</td>
<td>0.45</td>
<td>29</td>
</tr>
<tr>
<td>Full-time employees- percent of total</td>
<td>82.34</td>
<td>12.31</td>
<td>29</td>
</tr>
<tr>
<td>Registered nurses per 1000 enrollees</td>
<td>0.09</td>
<td>0.08</td>
<td>29</td>
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<tr>
<td>LPN's per 1000 enrollees</td>
<td>0.13</td>
<td>0.12</td>
<td>29</td>
</tr>
<tr>
<td>Medical group enrollment</td>
<td>24,753.00</td>
<td>13,444.00</td>
<td>30</td>
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<tr>
<td>Medicaid enrollment- percent of total</td>
<td>12.86</td>
<td>14.18</td>
<td>30</td>
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<tr>
<td>Medicare enrollment- percent of total</td>
<td>8.03</td>
<td>3.76</td>
<td>30</td>
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<tr>
<td>Percent of enrollees- graduated high school</td>
<td>68.94</td>
<td>12.13</td>
<td>30</td>
</tr>
<tr>
<td>Metric</td>
<td>Mean</td>
<td>S.D.</td>
<td>Cases</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>Percent of enrollees- graduated or attended college</td>
<td>39.25</td>
<td>15.88</td>
<td>30</td>
</tr>
<tr>
<td>Dual Choice Loss Ratio</td>
<td>1.00</td>
<td>0.21</td>
<td>30</td>
</tr>
<tr>
<td>Medical record completeness</td>
<td>2.31</td>
<td>1.54</td>
<td>26</td>
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<tr>
<td>Pap Smear Testing Rate</td>
<td>29.08</td>
<td>8.98</td>
<td>29</td>
</tr>
<tr>
<td>Physician attrition</td>
<td>0.43</td>
<td>0.30</td>
<td>30</td>
</tr>
<tr>
<td>Dual choice loss ratio</td>
<td>1.00</td>
<td>0.21</td>
<td>30</td>
</tr>
<tr>
<td>Laboratory tests/ 1000 enrollees</td>
<td>3771.67</td>
<td>1146.00</td>
<td>30</td>
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<tr>
<td>Urine tests/ 1000 enrollees</td>
<td>1810.00</td>
<td>576.95</td>
<td>30</td>
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<tr>
<td>Tissue exams/ 1000 enrollees</td>
<td>6.69</td>
<td>4.93</td>
<td>30</td>
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<tr>
<td>Glucose tolerance/1000 enrollees</td>
<td>5.35</td>
<td>6.27</td>
<td>24</td>
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