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**HSO PERFORMANCE: A CRITICAL APPRAISAL
OF CURRENT RESEARCH**

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HSO Performance: A Critical Appraisal
of Current Research

Centre for Health Economics and Policy Analysis
McMaster University

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Glossary

ACIP	Ambulatory Care Incentive Program
CHC	community health centre
FFS	fee-for-service
GHC	Group Health Cooperative of Puget Sound
HMO	health maintenance organization
HSO	health service organization
SSM-GHA or GHA	Sault Ste Marie Group Health Association

Summary

This document reviews the findings of studies of the clinical and economic performance of Ontario's Health Service Organizations and makes recommendations for further evaluation. The tentative conclusions regarding HSO performance indicate that:

1. The HSO program in total and some HSOs individually have lower rates of hospitalization of their patients.
2. The use of ambulatory care by HSO and FFS patients is about the same.
3. HSO physicians manage greater patient loads.
4. HSOs employ more non-physician health personnel.
5. Some HSOs provide higher quality of care.
6. Some HSOs are better structured to deliver preventive services to their patients.
7. HSO physicians are more likely to believe their method of remuneration favours the delivery of preventive services.
8. HSO patients are less satisfied with their care.

These conclusions are tentative because there are several methodological problems with the studies on which they are based: eg. the estimation of the true size of a practice, the self-selection of patients and providers, and the calculation of costs (particularly for hospital care). As well, the existing evaluations involve few centres and there are many differences among the centres. Hence generalisations of the findings to the wider population of providers may be invalid.

It appears that although payment mechanisms can affect the cost and quality of health care, the differences within modalities are as great or greater than the differences between modalities. Factors, other than payment mechanism which have been found to affect the quality or cost of health care include: group practice,

peer review, other financial incentives, other organizational determinants (eg. institutional links); the use of non-physician providers, and the provider selection process.

An important step in evaluation is to set out the core objectives of the program under evaluation. Primary objectives might include shifting physicians to non-FFS practice, reducing hospital utilization, enhancing disease prevention and health promotion activities, promoting better maintenance care for chronic illness, and enhancing the health status of the population.

Once the primary objectives are clearly specified measurable targets may be selected. To guide the development of the HSO program it is important to identify other practice features associated with better performance rather than simply study the effects of payment mechanism alone.

Executive Summary

The development of HSOs has been guided by the assertion that health care providers paid by capitation could provide the same or better quality care for less cost than providers paid on a fee-for-service basis. The empirical support for these assertions has largely come from studies comparing fee-for-service (FFS) to non-fee-for-service practices outside of Ontario. But the non-FFS practices in these studies have often differed from HSOs in terms of their structural and financial characteristics.

Studies of HSOs

Ten reports were found which compared the economic or clinical performance of HSOs and FFS practice. In order to grade the quality of the results of the studies, the following scheme is used in this paper;

+ Some justification for making the statement but the confidence level is low and further investigation could easily alter the conclusion.

++ More justification for the statement but the results should still be considered tentative for important policy decisions without further investigation.

+++ Based on convincing empirical investigations from a substantial number of studies. A large number of studies showing different results would be necessary to reverse this conclusion.

Findings

The HSO program in total and some HSOs individually have lower rates of hospitalization of their patients.++

The utilization of ambulatory care by HSO enrollees is

approximately the same as for FFS patients.+
HMO physicians manage greater patient loads. ++

HMOs employ more non-physician health-care personnel.++

HMOs provide a higher quality of care.+

HMOs are better structured to deliver preventive services to their patients.+

HMO physicians are more likely to believe that their own method of remuneration favours the delivery of preventive services.+

Patients of HMOs are somewhat less satisfied with some aspects of their care.+

Problems with HMO Evaluations

There are several methodological problems which limit the usefulness of the evaluation literature. These include:

- * The estimation of the true practice population
- * The self-selection of patients and providers
- * The calculation of costs (particularly for hospital care)
- * The limited attention given to within modality variation

Other Canadian non-FFS Delivery Modalities

Findings from evaluations of other Canadian non fee-for-service modalities (in particular Community Health Centres (CHCs)) offer some lessons for the HMO program. A controlled study of the performance of CHCs found that the overall costs of care were between 13% and 17% lower. Quebec's centres locaux de services communitaires (CLSCs) were found to provide higher quality care for patients presenting with headaches, more appropriate cancer screening, better cancer prevention services, and more complete childhood immunization. (In the United States, the findings are

equivocal whether community health centres have decreased the use of hospital emergency rooms and outpatient clinics.)

Health Maintenance Organizations

In the United States over 31 million people receive their health care from Health Maintenance Organizations (HMOs). The main conclusions from studies of HMOs are:

HMO patients have less hospital utilization.+++

HMO patients use approximately the same amount of ambulatory care as FFS patients.+++

HMO physicians have greater patient loads.+++

HMOs use non-physician health care personnel at the same rate as FFS practices.++

The quality of the care delivered by HMOs to typical patients is the same as that in the FFS sector.++

HMOs deliver more preventive services.+

HMO patients are less satisfied with their care.++

Overview of Empirical Results

Payment mechanisms can affect the cost and quality of health care in at least some places at some time. But, differences within modalities are as great as or greater than the differences between modalities. Factors other than payment mechanism which have been found to affect the quality or cost of health care include:

- * practice organisation (solo versus group)
- * peer review
- * other financial incentives

- * other organizational determinants eg. institutional links
- * use of non-physician providers

The findings of some studies indicate that certain types of non-FFS practice can provide the same quality of care as FFS practice and at less cost. There is also support for the hypothesis that certain types of non-FFS practice deliver more prevention and health promotion services than the average FFS practice. However, findings also indicate that factors other than payment method are important for efficient, effective health care.

An Evaluation Program for HSOs

The first step is to set core objectives for HSOs based on the overall goal of improving the efficiency of health care provision. These could include:

- * shifting physicians to non FFS practice
- * reducing hospital utilization
- * enhancing disease prevention and health promotion
- * promoting better maintenance care for chronic illness
- * enhancing population health status

Once primary goals are specified then measurable targets may be derived. Empirical findings indicate that payment method can affect clinical performance and that some HSOs are performing in a superior fashion. To guide the development of the HSO program it is important to have a better understanding of the other factors which make some HSOs successful in certain parameters while others are not. In order to plan new delivery modalities (including other non-FFS modalities like CHCs and Comprehensive health organisations, CHOs), these other features should be identified rather than study the effects of payment mechanism alone.

I. INTRODUCTION

The development of Health Service Organizations has been guided by the assertion that health-care organizations paid on the basis of capitation could provide the same or better quality care less cost than primary care providers paid on a fee-for-service (FFS) basis. For example, in the Toronto Star, Rosemary Speirs wrote,

[The HSO program] encourages doctors to practice preventive medicine, so that patients won't need attention and doctors save money.

But, the empirical support for these assertions has largely come from studies comparing FFS to non-FFS practices outside of Ontario. In addition, the non-FFS practices in these studies have often had significant structural and financial differences to the typical Ontario HSO. In this paper the literature on the performance (financial and clinical) of Ontario's HSOs is critically appraised. The empirical findings on the effect of payment system in other jurisdictions. Finally proposals are advanced for the evaluation of HSOs.

In this paper an HSO is defined as a health care facility which provides clinical diagnostic, therapeutic, and preventive services to a roster of regular patients and to transient patients and is paid (in the main) by capitation.

A community health centre (CHC) is defined as providing clinical diagnostic, therapeutic, and preventive services to regular, special care and transient patients as well as participatory health promotion to a defined geographical or demographic community. The facility is not paid, in the main, by fee-for-service or capitation.

II. REVIEW OF HSO PERFORMANCE

II.A. SOURCES FOR REVIEW

Various sources were used to locate studies of HSOs. These included the library of the Ontario Ministry of Health, Ministry officials, health service researchers, and selected HSOs.

Ten reports comparing the economic or clinical performance of HSOs versus FFS practice were found. These are identified with an asterisk in the bibliography at the end of this report. Eight of these reports are discussed in detail in Appendix A. Six of these were published between 1973 and 1981 and concern the Sault Ste Marie Group Health Association (SSM-GHA) or the St. Catharines and District Community Group Health Foundation. The routine reports from the Ambulatory Care Incentive Program (ACIP) were also used to provide comparative data on the performance of HSOs. A number of other reports were reviewed which concerned HSOs or investigated selected performance indicators for particular HSOs.

II.B. RESULTS OF THE CONTROLLED STUDIES OF HSO PERFORMANCE

The University of Michigan/ University of Toronto Study, Ministry of Health SSM-GHA/ Glazier Health Centre Study, and the Wolfson Study had serious methodological problems (see Appendix A). Consequently these studies are not included in this discussion. In order to grade the quality of the results of the other studies, the following scheme, adapted from Luft's review of HMOs, is used.

+ Some justification for making the statement but the confidence level is low and further investigation could alter the conclusion.

++ More justification for the statement but the results should still be considered tentative for important policy decisions without further investigation.

+++ Based on convincing empirical investigations from a substantial number of studies. A large number of studies showing different results would be necessary to reverse this conclusion.

II.B.i. The effect on hospitalization

The HSO program in total and some HSOs individually have lower rates of hospitalization of their patients.++

The Ministry of Health initiated the Ambulatory Care Incentive Program (ACIP) in 1979 to provide an incentive for HSOs to deliver ambulatory care as a substitute for institutional care. The hospital utilization of HSO patients is compared to hospital utilization in that particular region of the Province (with appropriate adjustments for different age/sex mixes of the populations). The HSO receives one-third of the average per diem hospital cost in that community for each day of hospital care 'saved'. For this report, the ACIP data was reviewed for 1987-88 for 28 HSOs (19 physician sponsored, 5 university sponsored, and 4 community sponsored).

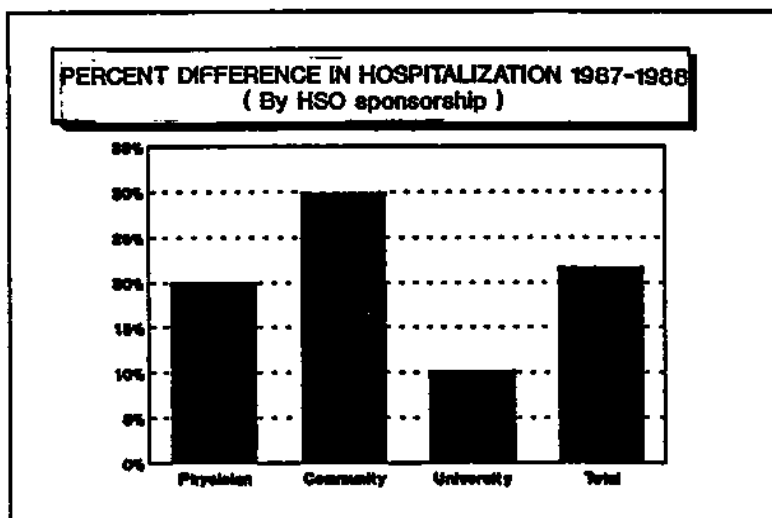


Figure 1. Differences in hospital utilization of HSOs relative to FFS by type of sponsorship. Data source -- Ontario Ministry of Health (ACIP).

Figure 1 indicates that overall, the hospital utilization of HSOs was 21.7% lower than for FFS. It was 20% lower for the physician sponsored HSOs, 10.2% for university-sponsored HSOs, and 29.9% lower for community-sponsored HSOs. These data indicate that the HSO rate of hospital utilization is falling faster than in the FFS sector. The HSO hospital utilization fell 10.6% from 1984-85 to 1987-88 while the decrease was only 4.5% for FFS.

The Hastings et al (1972), Mott et al (1973), and DeFriese (1979) studies showed that the SSM-GHA patients used fewer hospital services than patients of FFS physicians in Sault Ste Marie. The reductions in hospitalization seen in the three controlled studies and the current ACIP data were of the order of 30%. The St. Catharines Clinic was estimated to have approximately 20% lower rates of hospital utilization for its patients. The studies of the SSM-GHA showed the lower utilization of hospital care was largely due to a lower number of admissions. The average length of stay for an admission was approximately the same. The study of St. Catharines showed the opposite trend: lower hospital utilization at that clinic was largely due to shorter lengths of stay, not fewer admissions.

The current ACIP data show that the main reason for lower hospital utilisation of HSOs is fewer admissions. Admissions are about 15 per cent lower than under FFS while length of stay is only 5 per cent less. The lower hospital utilisation of physician-sponsored HSOs arises from fewer admissions and shorter stays of similar proportions. The lower hospital utilisation of community-sponsored centres arises from lower rates of admission alone.

As Barer (1981) noted though, a reduction in overall hospital utilization does not directly translate into a comparable reduction in expenditures (see section IID below). He calculated that a 20% reduction in the number of hospital days might lead to a saving of only 5 - 8% in hospital costs.

II.B.ii. The effect on ambulatory care

The utilization of ambulatory care by HSO enrollees is approximately the same as for FFS patients.+

Hastings et al (1973) had difficulty measuring the utilization of medical services but Mott et al (1973) and DeFriese (1974) found similar utilization rates for the SSM-GHA patients compared to FFS patients in Sault Ste Marie. The St. Catharines/Brantford Clinic Study showed higher levels of service utilisation and costs for the St. Catharines Clinic. However, closer analysis shows that the number of ambulatory services per patient was very similar. The total costs of ambulatory care were also likely to be similar.

II.B.iii. Human resource utilization

II.B.iii.a. Physician utilization

HSO physicians manage greater patient loads.++

Lomas and Cushman (1974) calculated physician to population ratios in all 17 HSOs existing in 1982-83 and compared this to the FFS sector in Ontario. They found that HSOs used approximately 22% fewer general practitioners and about 40% fewer specialists.

They concluded that fewer doctors would be required if there were more HSOs of the type then in existence. The results for general practitioners are shown in Figure 2. Three estimates of the physician to population ratio were made for each delivery modality. It is apparent that the ranges do not intersect even under the least favourable assumptions for HSOs and the most favourable assumptions for FFS.

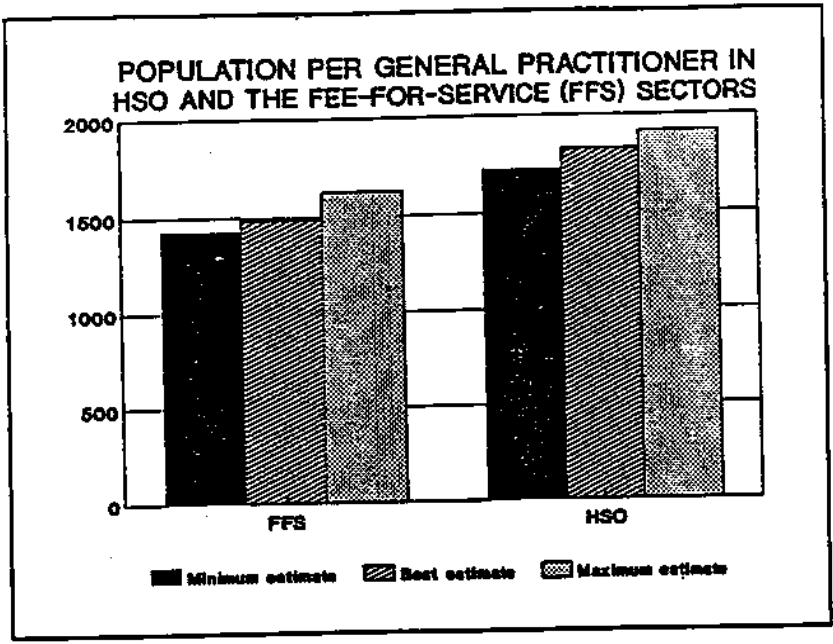


Figure 2. Population per general practitioner in HSO and FFS sectors. From Lomas and Cushman 1984.

 II.B.iii.b. Utilization of non-physician personnel

HSOs employ more non-physician health-care personnel.++

Nurse practitioners (now usually referred to as primary care nurses) and other non-physician health care workers have considerable potential to substitute for physicians in the delivery of a range of services. HSOs have a financial incentive to substitute more appropriate personnel for physicians. A number of studies which have indicated that there are non-economic reasons for the poor utilization of other health-care personnel. Lomas and Abelson (1988) report that HSOs are more likely to have nurse practitioners than solo or group FFS practices. The use of non-physician health-care personnel in HSOs is still considerably less than the potential indicated by the literature.

II.B.iv. Quality of Care

II.B.iv.a. Overall quality of care

HSOs provide a higher quality of care.+

The physicians at the St. Catharines (HSO) and Brantford (FFS) Clinics cooperated with the Ministry of Health to develop a protocol for evaluating the quality of care provided for six 'tracer' conditions (ambulatory diabetes care, institutional diabetes care, cholelithiasis, myocardial infarction, well-baby care, and perinatal care).

Physicians were used to rate the charts of those patients with the 'tracer' conditions. The quality of care audit showed higher quality care at the St. Catharines facility. It was noted that much of the difference in the ratings of quality of care may have been due to the better record-keeping at the St. Catharines facility.

DeFriese (1975) found that GHA female patients were more likely to have had a 'comprehensive' examination* than their FFS counterparts.

II.B.iv.b. Delivery of preventive services

HSOs are better structured to deliver preventive services to their patients.+

According to Vayda (1988) HSOs and CHCs considered together are more likely to have recall systems for immunization and pap smears than FFS group practices in Ontario. Lomas and Abelson (1989) found this trend but their results were not statistically significant. Lomas and Abelson also found tremendous variations among practices within payment modalities.

* Comprehensiveness was defined by the proportion of six specified procedures of the physical examination which were done on the most recent visit to a physician.

II.B.v. Patient satisfaction

HSO patients are less likely to see the same doctor on each encounter but are more likely to be satisfied with certain logistical aspects of seeking care (eg. less waiting time to see a doctor, more convenience for lab and x-ray testing, and easier parking).+

DeFries (1975) and Mott et al (1983) found that persons attending FFS doctors in Sault Ste Marie were more likely to report seeing the same doctor for all episodes of care than patients attending the SSM-GHA. They also reported greater ease in speaking to a physician by telephone. But persons attending the GHA were more likely to report ease with logistical aspects of care (eg. less waiting time to see a doctor, more convenience of lab and x-ray testing, and easier parking).

II.B.vi. Provider Attitudes

HSO physicians are more likely to believe their own method of remuneration favours the delivery of preventive services.+

Lomas and Abelson (1988) found that doctors in HSOs (and CHCs) felt that their style of remuneration favoured the delivery of preventive services while the FFS doctors surveyed thought that FFS generally did not favour the delivery of preventive services. No data have been found on the attitudes of non-physician personnel.

II.C. OTHER RELEVANT INFORMATION ON HSOs

Anderson et al (1985) found that the estimate of the patient roster for the Sharbot Lake HSO was reliable and valid. However, this survey was conducted in an area where approximately 20% of the residents were regular patients of the HSO. In a community with

less HSO penetration, there would be less possibility of someone on the roster actually being a patient at an HSO.

Lomas et al (1986) studied use of outside services by patients attending the Henderson General Hospital (Hamilton) family practice. The results showed that 5% of patients surveyed had used an outside service in the previous month and 7% had used at least one outside service in the previous three months. Almost all of the outside use was for emergency care. Furthermore, 65% of the respondents claimed not to know that the HSO lost income when they used outside services and 27% said they would use outside services less as a consequence.

II.D. METHODOLOGICAL PROBLEMS WITH THE EVALUATION DATA

II.D.i. The estimation of the true size of a practice.

Research in primary care is plagued by inaccurate estimation of the true population served by a practice (Anderson et al 1988, Bass 1976, Fraser 1978, Fraser and Clayton 1981, Smith 1988). Anderson et al (1985) showed that one HSO roster was quite accurate but, as noted above, this may be less likely in areas with less HSO market penetration or more FFS competition than that analysed. FFS practices do not have a financial incentive to keep track of regular patients, and conventionally define their 'list' of patients as persons who have used the practice within the previous 24 to 36 months.

Evaluations of HSO versus FFS which use only persons who utilize a practice within a particular time period will eliminate those patients who are low or infrequent users. Because HSOs do not have a financial incentive to see patients, a higher proportion of an HSO practice is likely to be composed of these types of individuals. The elimination of low users from the evaluation

would therefore artificially inflate the utilization rates per capita of HSO patients.

On the other hand, evaluations which use the entire HSO roster versus FFS patients who have utilized services within a certain time period will artificially inflate the utilization rates per capita of the FFS patients. The severity of this bias increases as the time period under study is reduced.

II.D.ii. The self-selection of patients and providers

In general Ontario residents can choose where to obtain primary health care. Certain practices tend to attract certain types of patients and practice populations tend to vary systematically on both measurable and unmeasurable characteristics which may be correlated with health status and health-service utilization. Although utilization data can be adjusted for age and gender, there are other important determinants of health status and service utilization which may be unmeasurable (eg. patient attitudes) or difficult to measure (eg. case-mix).

Similarly, physicians choose their practice locations and styles. Physicians working in non-FFS practice may have a different practice style from FFS doctors that is unrelated to payment mechanism (see Pineault 1988). If patient health status or utilization differences are observed between HSO and FFS practices which are free of patient selection effects, it is not clear if the cause of the differences is the effect of the payment system or if physicians with a particular practice style irrespective of payment mechanism have simply chosen to operate under captation (i.e, provider self-selection).

These self-selection issues affect all the studies reviewed in this section but they have particular consequence for the analysis of the ACIP data. Although these data are adjusted for age

and sex, as mentioned above, this does not guarantee comparability between the HSO and FFS patient populations. Another plausible explanation for the lower utilization of the HSO patients could be that they are systematically healthier and/or otherwise less in need of hospitalization. On the other hand if there is some indication that a particular practice has sicker patients (eg. is located in a poorer part of the comparison area), then there is more reason to believe any observed hospital utilization lower than the area average is real. For example, one of the four community-sponsored HSOs is located in a poor part of Toronto and yet it has a much lower rate of hospitalization.

II.D.iii. Cost estimates

II.D.iii.a. Estimation of the costs of hospital care

The estimation of the costs of hospital care is relatively unsophisticated in the studies of HSO performance. The main problem is that the hospital per diem rate is an average cost but the days that HSOs might save are not necessarily average-cost days. We would expect the savings to accrue mainly at the margin. In other words, the days of inpatient stay or the reduced admissions for a ward saved do not amount to enough bed reductions in any one community to close a hospital. It may be difficult to justify (on economic terms alone) laying off some staff or developing a community program on the basis of the bed-days saved by HSOs unless the market penetration of HSOs is greater than that seen in Ontario up to this point. Barer (1981) noted that a 20% reduction in bed-days could result in hospital savings of only 5 to 8%* because of the effect of marginal reductions in inpatient stay and admission costs and the increased need for ambulatory and community programs.

* That is not to say, as Barer notes, that these savings are not considerable in absolute terms.

II.D.iii.b. Estimation of the costs of radiological and laboratory testing

The studies of the SSM-GHA and the St. Catharines Clinic had severe problems in comparing the costs of radiological and laboratory investigations. The two HSOs had onsite facilities but the FFS clinics mainly used hospital-based facilities. The costs of these hospital-based investigations could not be determined separately.

II.D.iv. Evaluations involve few centres and there are indications of great variability among the centres

Most of the studies were performed in the 1970s and involved the SSM-GHA and/or the St. Catharines Clinic. The St. Catharines facility no longer exists and the SSM-GHA stands unique in many characteristics. The SSM-GHA is a well-established, large, multi-specialty, community-sponsored HSO with extensive use of non-physician personnel and a strong sense of mission. Previous studies of the SSM-GHA and current ACIP data indicate the facility is almost certainly more efficient (i.e. uses less resources per unit health status improvement) than the FFS sector in Sault Ste Marie. But this does not mean that the results can be extrapolated to other HSOs, particularly those which lack most of the SSM-GHA's key characteristics.

The limited data that exist on the population of HSOs show great diversity in structure and performance. Lomas and Abelson (1989) showed that variations within modalities are as great as between modalities in regard to disease prevention activities. There are also striking differences between HSOs in the populations served, the numbers and types of personnel, sponsorship, and overall programming. This gives more reason to be cautious about extending the results of previous evaluations of individual HSOs to all centres now in the program.

III. REVIEW OF OTHER NON-FFS DELIVERY MODALITIES

Some widely held beliefs concerning HSO performance arise from generalizations made from research on HMOs in the United States. A brief review of the state of this research is, therefore, warranted. In addition Community Health Centres (CHCs) are often included in the same category as HSOs, despite major differences in structure, payment, and mission. In this section a review of the knowledge in these areas is provided.

III.A. SOURCES FOR THE REVIEW

Computerized Medline and Healthline searches were conducted with a senior research librarian at the Health Sciences Library at McMaster University. One search identified all recent articles published by five key researchers involved in the Rand Corporation Health Insurance Experiment. Articles published before August 1988 were listed in a separate published document from the Rand Corporation. Another search used the MeSH terms 'community health centres' and 'fees and charges' each in combination with 'evaluation studies'.

III.B. EVIDENCE ON FFS VERSUS NON-FFS PRACTICE (EXCLUDING HMOs)

III.B.i. Community Health Centres (USA)

During the 1960s, the federal government provided funds for the development of CHCs in poor areas of the country as part of President Johnson's "war on poverty". The aim of the CHC program was to improve access to health services for poor people. The findings of research studies suggests that CHCs did improve access to medical and dental services. But the findings are less clear on whether CHCs reduced the use of hospital emergency rooms and outpatient clinics. No controlled studies were found which examined health outcomes for CHC patients.

III.B.ii. Community Health Centres (Canada)

Community health centres are located in most Canadian provinces but even in provinces where they have a significant presence (eg. Saskatchewan and Quebec), they provide primary medical care to only 5% or less of the population. There is little evidence on the performance of CHCs in Ontario.

III.B.ii.a. Saskatchewan

In Saskatchewan there are four CHCs which provide primary health care to approximately 4% of the Province's population. At present the CHCs are financed on a line-by-line budget although at other times they have been paid on a FFS basis. In the early 1980s a controlled study was conducted to compare the performance of the Saskatoon and the Prince Albert CHCs to FFS practitioners in the same communities. The results indicated that overall costs of care were 13% lower for the Prince Albert CHC and 17% lower for the Saskatoon CHC. Using a modification of the per diem rate, the researchers estimated that hospital costs were 23% lower for the Prince Albert CHC and 30% lower for the Saskatoon CHC. Most of these cost differences resulted from fewer admissions although lengths of stay were also shorter. Drug costs were also lower in the two CHCs, partly because of fewer prescriptions but also because the Saskatoon CHC had its own pharmacy.

III.B.ii.b. Quebec

Quebec introduced centres locaux de services communitaires (CLSCs) in 1972 as part of the reform of the health and social services system. There are now over 160 CLSCs in the Province providing primary health care to about 5% of the population (Bozzoni 1988). CLSCs are paid not by capitation but rather by a combination of global and specific program funding. They provide a range of services including primary health care, social services, home care, school health, and occupational health. Most CLSCs also have community organizers who engage in health promotion

activities. Considerable variation exists in the range of services provided, although the Quebec government has moved recently to standardize service provision to include primary medical care, primary mental health services, primary social services, home care, and child welfare services.

Various studies have shown CLSCs provide higher quality care for patients presenting with headaches (Renaud et al 1980), more appropriate cancer screening (Battista 1983), better cancer prevention services (Battista et al 1986), and more complete childhood immunization (Allard et al 1985).

Battista et al (1986) studied the attitudes and behaviours of 430 general practitioners towards clinical prevention activities for four types of cancer. The physicians were from four practice settings -- urban FFS, rural FFS, CLSC and University family practice centres. The mode of reimbursement was statistically significantly associated with more appropriate clinical activities for all four types of cancer. Of note, women physicians were more likely to engage in clinical cancer prevention activities, particularly for cervical and breast cancers and particularly if they were paid by salary.

Pineault et al (n.d.) surveyed a sample of 616 general practitioners in different practice settings. CLSC doctors were younger, were more likely to practice in a group, do less emergency room and hospital work, and do more community health activities. The CLSC doctors also were more positive about working in multi-disciplinary teams, were interested in the demedicalization of health care, favoured patient involvement in their care, and were less likely to endorse a strict biomedical model of health care. The authors suggested that self-selection is probably responsible for the different attitudes displayed by physicians.

III.B.ii.c. Ontario

Use of nurses, nurse practitioners, and other health care personnel (social workers, chiroprodists, physiotherapists) in 25 HSOs and 11 CHCs was analysed using data from the Ontario Ministry of Health and the study by Lomas and Abelson (1988). The results are shown in figure 3. HSOs use fewer non-physician health professionals than CHCs. Lomas and Abelson report that CHCs were more likely to use nurses and nurse practitioners for preventive screening programs.

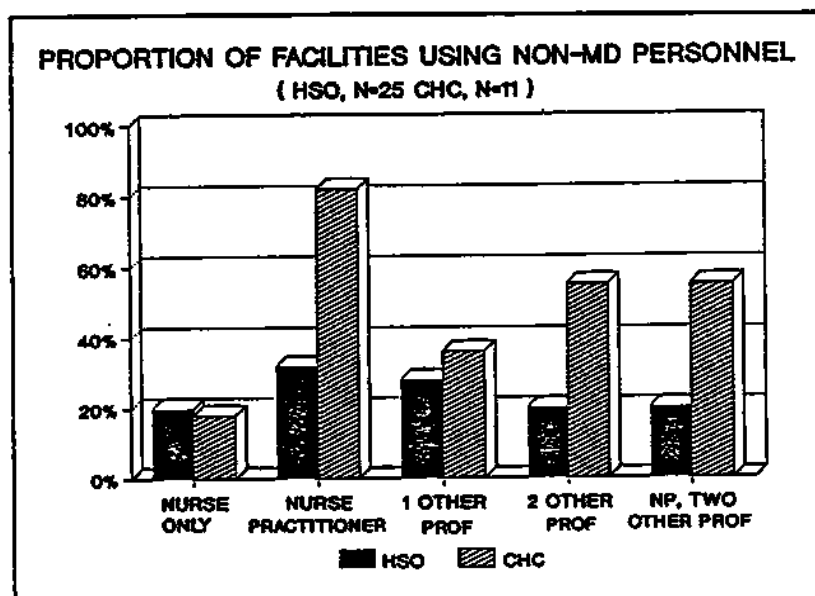


Figure 3. Proportion of HSOs and CHCs using non-physician health-care personnel. Data source -- Ontario Ministry of Health.

III.C. THE HMO EVIDENCE

Luft (1981) defines an HMO as follows;

- * An HMO assumes contractual responsibility to provide or assure the delivery of a stated range of health services. This includes at least ambulatory care and inpatient hospital services.

- * An HMO serves a population defined by enrolment in the plan.
- * Subscriber enrolment to an HMO is voluntary.
- * The consumer pays a fixed annual or monthly payment that is independent of the use of services. (This does not exclude the possibility of some minor charges related to utilization.)
- * The HMO assumes at least part of the financial risk or gain in the provision of services.

In the United States over 31 million people receive their care from HMOs. There are many types of HMOs* and the results of the scientific literature must be interpreted with this in mind. The Rand Health Insurance Experiment (HIE) was a watershed study in the literature on HMOs. Nevertheless it examined the effect of one particular prepaid group practice HMO (the Group Health Cooperative of Puget Sound). (See Appendix B for details of the HIE).

In this section the findings on HMOs are summarized along the same six dimensions as for HSOs and graded in the same form, with a slight modification. If Luft's conclusion was ++ or +++ in his review of HMOs (Luft 1981), and the results of the Rand Health Insurance Experiment agreed with Luft, and there was no known existing contrary evidence, the conclusion is presented as +++.

III.C.i. The effect on hospitalization

HMO patients have less hospital utilization.+++

* For example, by sponsorship, profit status, corporate status of physicians, numbers and types of personnel, university affiliation and ownership of institutions.

Luft (1981) found that enrollees in pre-paid group practice HMOs had approximately 35% lower rates of hospitalization. Enrollees of Independent Practice Associations (IPA) HMOs had 5-25% lower utilization*. In the Rand Health Insurance Experiment, the HMO achieved a 40% reduction in hospital utilization (Manning et al 1984).

III.C.ii. The effect on ambulatory care

Pre-paid group practice HMO patients use approximately the same amount of ambulatory care as FFS patients.+++

Luft (1981) found that, for comparable insurance coverage for ambulatory care, HMO and FFS patients used the same number of services. This was confirmed in the Rand experiment (Manning et al 1984).

III.C.iii. Human resource utilization

III.C.iii.a. Physician utilization

HMO physicians have greater patient loads than FFS physicians.+++

Although Luft (1981) did not specifically address this issue the Rand Study (Manning et al 1984) and other sources (eg. Steinwachs et al 1986) indicate that HMO physicians service more patients. This is probably because of more efficient delivery of primary care (e.g. fewer call backs, better patient education, etc.)

* IPAs are networks of individual physicians and physician groups who contract with the IPA board to provide care at fixed rates under certain terms and conditions to a recognized panel of patients. The physicians bill the IPA on a FFS basis for care provided to IPA patients but agree to certain conditions (eg. peer review) in return for the opportunity to see patients.

III.C.iii.b. The use of non-physician personnel

HMOs use non-physician health-care personnel at the same rate as FFS practices.++

Luft (1981) distinguishes between two types of personnel. Those who complement a physician's practice (eg. a traditional office nurse who prepares a patient for the doctor to examine) and those who substitute for the doctor (eg. a nurse practitioner who takes over well person care). Luft (1981) found that in practice situations where physicians had more autonomy, complementary personnel would be used but not, necessarily, substitute personnel. Spritzer et al (1974) and Mitchell (1989) have noted that physicians express concerns about a variety of issues regarding the use of other personnel (eg. unclear liability) but, perhaps, are more concerned about territorial encroachment.

III.C.iv. Quality of care

III.C.iv.a. Overall quality of care

The quality of the care delivered by HMOs to typical patients is the same as that in the FFS sector.++

Noting the serious problems involved in the measurement of quality, Luft (1981) found no consistent advantage for either HMOs or FFS. The Rand study found that overall outcome measurements were no different between the two groups (Brook et al 1983 and Ware et al 1986) although there were some differences for specific subgroups. Ware et al (1986) reported that lower-income, initially 'at risk' persons fared better with the FFS doctors while higher-income, initially 'at risk' persons did better with the HMO. However, Sloss et al (1987) found no more differences than might be expected to have occurred by chance alone in a variety of physiologic measurements. Unfortunately, the Rand experiment lacked

the numbers of subjects to have the statistical capability to detect many clinically important differences. Additionally, the results in the literature surveyed here covered only young to middle-aged adults and specifically excluded the elderly and the very ill. Yet these are the groups for which differences in health care are most likely to make a difference in health status.

Francis et al (1984), Yelin et al (1986), and Wilner et al (1981) have shown that, by and large, non-profit HMOs do not skimp on quality. Hlatky et al (1983) showed that HMO cardiologists are more conservative in their diagnostic work-ups than FFS doctors. However, university based-cardiologists agreed more with the HMO cardiologists than with FFS specialists in their approaches to patients.

III.C.iv.b. Delivery of preventive services

HMOs deliver more preventive services.+

Luft (1981) noted the findings on the delivery of preventive services equivocal. In particular, he noted that under equal insurance coverage the delivery of preventive services was the same. However, the Rand study did find a greater consumption of preventive services in the HMO patients (Manning et al 1984). Luft (1981), Pineault (1988b), and others raise concerns about the appropriateness of the definition of 'preventive services'.

III.C.v. Patient satisfaction

HMO patients are less satisfied with their care than FFS patients.++

The Rand Study found that overall satisfaction was lower for HMO than for FFS patients and that HMO patients' satisfaction was statistically significantly lower for eight out of fifteen measures

of satisfaction. Higher-income persons were more likely to be dissatisfied with the HMO than lower income patients. Some of these results may be due to certain idiosyncrasies of the Group Health of Puget Sound at that time'. However, other types of dissatisfaction" may be due to the practice style of the HMO which is integral to the cost savings of the HMOs. Luft (1981) found that HMO patients were more likely to be satisfied with their care if they attended a smaller HMO.

III.C.vi. Provider satisfaction

Overall, there seem to be no differences in the work satisfaction of physicians in HMOs compared to FFS practice.+

Luft (1981) found HMO doctors were less satisfied in some areas (feeling they had more demanding patients and inflexible work schedules) but more satisfied in others (work week and income). Luft pointed out that until the 1970s, HMO physicians had frequently been ostracized by their colleagues because of their practice choice. The Rand study did not look at this item.

III.C.vii. Other relevant information on HMOs

- * Group practices (HMOs or FFS) are more efficient than solo physician practice. Groups with larger than 5 physicians however, are less efficient than smaller groups.+

* For example, patients were often kept 'on hold' on the telephone for over twenty minutes to make an appointment.

** HMO patients thought their doctors less technically proficient because they didn't perform as many investigations as FFS doctors. This effect was particularly seen with the higher-income patients.

- * HMOs provide better quality care than solo FFS practitioners according to various measures of structure and process (primarily better record-keeping). However, HMOs do not necessarily provide better care than FFS multi-specialty groups.+

III.D. CONCLUSIONS

Although payment mechanisms can affect the cost and quality of health care in at least some places at some time the differences within modalities are at least as great as the differences between modalities. Factors other than payment mechanism which have been found to affect the quality or cost of health care include:

- * group practice
- * peer review
- * other financial incentives
- * other organizational determinants
- * use of non-physician providers

Some of these variables act to positively change physicians' clinical behaviour. Others may not be associated directly with physicians at all, eg. the better use of non-physician health care personnel. Perhaps the key unresolved issue is the provider self-selection process. Would the physicians in non FFS practice who are more efficient than their colleagues in FFS also perform better under any payment method?

IV. FUTURE EVALUATION ACTIVITIES

IV.A. THE NEED FOR A CONCEPTUAL FRAMEWORK

The results of existing research indicate that certain types of non-FFS practice can provide care at least as good as FFS practice and at less cost. Furthermore, certain types of non-FFS practice provide more health promotion and disease prevention activities than FFS practice. But, the results also indicate that factors other than payment method are important for encouraging the efficient provision of health care. Research aimed at improving the efficiency of health care provision should seek to identify these other features rather than study further the effects of payment mechanism alone.

It is also important to examine specific combinations of factors. Battista et al. (1986) and Pineault et al. (1988a) have shown that there are particular combinations which are more likely to be associated with certain behaviours and attitudes in physicians. In particular, female gender in combination with salaried practice was associated with higher levels of cancer detection activities, patient involvement in their own care, and strong attitudes in favour of a social and preventive model of health care.

Local factors may be as or more important than specific practice factors. Hornbrook et al. (1985) has found tremendous variation in hospital utilization between Kaiser-Permanente's 14 regions --the magnitude of these variations being as great or greater than between Kaiser and local FFS practices. Hillman et al. (1989) demonstrated that financial incentives and HMO descriptors explained only 15% of the variation in hospitalization between HMOs

whereas market-area factors explained an additional 25%.* Wennberg (1985) noted substantial differences in patterns of practice between communities. He points to clinical uncertainty combined with the leadership patterns of medicine as the main factors in determining practice styles, resource consumption, and quality of care outcomes.

In other words, local factors may well have more influence than financial and organizational factors. However, Pineault et al. (1988a) suggest that these financial and organizational factors can be important, in the long-run, in determining the local factors which affect day-to-day practice decisions. For example, CLSCs appear to have a different 'corporate culture' for doctors than most HSOs in Ontario. One is, therefore, more likely to see practice styles differing from FFS sector, especially over time.

It is also important to clarify the aims of health-care provision in general, and primary health care in particular. The style of practice of primary health care providers will not, alone, be able to prevent a large number of diseases and conditions. Pineault (1988b) makes the point that formal health-care services have a relatively modest impact on the prevention of disease and the promotion of health. If the aim of primary care is disease prevention and health promotion, then an appropriate focus might be community-based health promotion activities.

IV.B. CONSIDERATIONS IN EVALUATING HSOs

The results of the studies reviewed indicate that non-FFS modalities can (but may not) be associated with more efficient practice. However, simply changing the mode of payment alone is

* This was when the market area variables were entered into the regression analysis after the other independent variables. Market area factors might have explained even more of the variation if they had been entered first.

unlikely to be enough. It is not clear that most of the HSOs in Ontario have the other key factors important for the success of non-FFS modalities.

Saward (1969) has referred to a 'genetic code' for successful alternative delivery of health care services and identified six necessary components: prepayment, group practice, an integrated facility, capitation payment, comprehensive coverage, and voluntary enrolment.

IV.B.i. What are the goals of the HSO program?

The most important step in the evaluation process is to set out the core objectives of the program within the context of the overall goal of improving the efficiency of health care provision. Is the primary objective to move a significant number of physicians to non-FFS practice? Is it to reduce the hospital utilization? Is it to enhance disease prevention and health promotion activities? Is it to promote better maintenance care for those with chronic illness? Is it to enhance the health status of the population? Once the primary objectives are clearly articulated, measurable targets may be selected.

IV.B.ii. What are the other important factors besides non-FFS payment?

Once the measurable targets have been set it may be possible to identify from the literature which factors are likely to be important for their attainment. For example, if one of the program objectives is to substitute ambulatory for institutional care, then according to the ACIP data (despite the biases mentioned in section III.C) some HSOs are doing well while the performance of others may be more equivocal. Why do some HSOs have a much lower rate of hospital utilization than FFS but others do not? We know that some HSOs, like the SSM-GHA do reduce hospital use compared to the FFS

sector in their community. The appropriate question to be asked is what other factors are associated with specific performance parameters within HSOs.

Another example would be prevention. We know that non FFS practice can be associated with better clinical preventive practice (Battista 1983, Battista et al. 1986 Manning et al. 1984). But we know that some HSOs are performing quite well in this area while others are not (Lomas and Abelson 1988). Further evaluations should investigate the effects of those factors found in other research to be associated with better clinical preventive practice eg. female gender, recall systems, etc.

There is abundant evidence that payment method can affect clinical performance and that some HSOs are performing in a superior fashion. To guide the development of the program (as well as the development of other non-FFS modalities like CHCs and CHOs) it is important to have a better understanding of the other factors which make some HSOs successful in certain areas while others are not.

IV.B.ii.a. Dealing with the self-selection issues

The future evaluation of HSOs should include methods of separating the effect of the payment mechanism and the effect of certain physicians choosing that mode of practice. One approach would be to study physicians' practice patterns before, during, and after joining the HSO program. It is also important to know more about the case-mix of HSO versus FFS practice. Do HSO patients have lower hospital utilization because they are attending a more efficient practice modality or because they are healthier?

IV.B.ii.b. Measuring quality of care

Another important area to evaluate is quality of care. The comparison between the St. Catharines and Brantford clinics showed that higher quality care was provided under the HSO, using crude methods of quality assessment. Methods for measuring quality of care have advanced greatly since that time and there is considerable expertise at both the Ontario chapter of the Canadian College of Family Physicians and the Ontario College of Physicians and Surgeons. The Ontario Medical Association has also expressed recent interest in quality assurance.

IV.B.ii.c. Measuring costs

There are many methodological issues involving costs but, there is a particular need to know the relative roles of lower rates of admission and shorter lengths of stay in the lower hospital utilization of HSO patients. Furthermore, does the HSO prevent the need for care entirely (eg. because of decreased rates of elective surgery or better maintenance care for those with chronic illness and subsequent avoidance of acute episodes) or does the HSO substitute intensive ambulatory for institutional care?

IV.C. EVALUATION: FINAL POINTS

Some of the evaluation issues outlined above can be addressed with retrospective studies of existing data. A comprehensive evaluation to inform and improve the structure and function of organized practice settings in Ontario (of which HSOs are only one example) is unlikely to be successful, however, unless it contains some prospective studies with the collection of original data. This is particularly true for assessment of quality of care in which differences in record-keeping may mask differences in quality.

BIBLIOGRAPHY

HSO EVIDENCE (* indicates controlled (comparative) study)

Anderson, J.E., Willan, Andrew R.(1988), "Estimating the size of family practice populations: quadratic odds estimation," Medical Care, Vol. 26, No. 12, pp. 1228-1233.

Anderson, John E., Gancher, Wendy A., Bell, Peter W. (1985), "Validation of the patient roster in a primary care practice" Health Services Research, Vol. 20, No. 3, pp. 301-314.

Barer, M.L. (1981), Community Health Centres and Hospital Costs in Ontario, Ontario Economic Council, Occasional Paper 13, Toronto.

Bass, Martin (1976), "Approaches to the denominator problem in primary care research," Journal of Family Practice, Vol.3, No. 2, pp. 193-195.

* DeFriese, G.H. (1974), The Sault Ste. Marie Community Health Survey of 1973: Community Health Centres and Private Solo Practice Under Universal Health Insurance: The Consumer's View, Final Project Report to the Minister of National Health and Welfare, Sault Ste. Marie Group Health Association, Sault Ste Marie.

* DeFriese, G.H. (1975), "On Paying the Fiddler to Change the Tune: Further evidence from Ontario regarding the impact of universal health insurance on the organization and patterns of medical practice," Milbank Memorial Fund Quarterly/ Health and Society, Vol. 53, No. 2, pp. 117-148.

Fraser, Robin C. (1978), "The reliability and validity of the age-sex register as a population denominator in general practice,"

Journal of the Royal College of General Practitioners, Vol 28, pp. 283-286.

Fraser, Robin C., Clayton, David G. (1981), "The accuracy of age-sex registers, practice medical records and family practitioner committee registers," Journal of the Royal College of General Practitioners, Vol. 31, pp. 410-419.

* Hastings, J.E.F., Mott, F.D., Barclay, A., Hewitt, D. (1973), "Prepaid group practice in Sault Ste. Marie, Ontario: Part I: Analysis of utilization records", Medical Care, Vol 11, No. 2, pp. 91-103.

Lomas, Jonathan, Cushman, Robert (1984), "Potential effects of a competitive system of health delivery on Canadian requirements for physician manpower," Paper prepared for the 75th Annual Conference of the Canadian Public Health Association, Calgary, Alberta, June 27, (mimeo).

Lomas, Jonathan, (1985), First and Foremost in Community Health Centres: The Centre in Sault Ste Marie and the CHC alternative, University of Toronto Press, Toronto.

Lomas, Jonathan, Labelle, Roberta, Woodward, Christel A. (1986), "Distribution of responses to a survey of consumers at a Health Service Organization: A survey of members of the Henderson Family Practice Unit conducted Fall, 1985," Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton.

* Lomas, Jonathan, Abelson, Julia (1989), "Do Health Service Organisations and Community Health Centres have higher disease prevention and health promotion activity levels than Fee-for-Service practices?" McMaster University, Centre for Health Economics and Policy Analysis, Working Paper No. 21.

* Mott, F.D., Hastings, J.E.F., Barclay, A. (1973), "Prepaid group practice in Sault Ste. Marie Ontario: Part II: Evidence from the Household Survey," Medical Care, Vol. 11, No. 3, pp. 173-188.

Muldoon, J. (1988), "A simulation model of the potential contribution of a competitive approach to controlling health care expenditures in Ontario. "Ph.D. Dissertation, Department of Economics, McMaster University, Hamilton.

Ontario Ministry of Health (n.d. 1974), Interim Report of the Ministry of Health/Sault Ste. Marie and District Group Health Association/ Glazier Medical Centre, Ministry of Health, Toronto.

*Ontario Ministry of Health (n.d. 1976), Health Care Report. St. Catharines and District Group Health Foundation and the Brantford Clinic. Evaluation of volume, quality and cost April 1, 1974 to March 31, 1975. Ministry of Health, Toronto.

Smith, Blake W.H. (1988), "The quadratic odds estimation (qoe) method for calculating practice denominators," Medical Care, Vol. 26, No. 12, pp. 1234-1237.

Speirs, Rosemary (1988), "Ministry should encourage alternative health care," The Toronto Star, March 27.

* University of Toronto School of Hygiene and University of Michigan School of Public Health (1973), Effects of Delivery Systems and Health Care Resources on Medical Care Behaviour, Report to the Ontario Ministry of Health (Demonstration Model No. 1, (PR221), Health Resources Development Fund), Toronto.

* Vayda, Eugene, Williams, A. Paul, Stevenson, H. Michael, et al., (n.d. 1988), "Characteristics of established group practices in

Ontario," Department of Health Administration, Faculty of Medicine, University of Toronto, Toronto, (mimeo).

* Wolfson, A.D. (1981), "Report on the Sault Ste. Marie Study," Report to the Ontario Ministry of Health, Toronto, (mimeo).

HMO EVIDENCE

Brook Robert H, Ware John E, Rogers William H, et al. (1983), Does free care improve adults' health? Results from a randomized controlled trial. New England Journal of Medicine, Vol. 309, No. 23, pp. 1426-1434.

Davies, Allyson Ross, Ware Jr, John E., Brook, Robert H., Peterson, Jane R., Newhouse, Joseph P. (1986), Consumer acceptance of prepaid and fee-for-service medical care: Results from a randomized controlled trial," Health Services Research, Vol. 21, No. 3, pp. 429-452.

Enthoven, Alain C. (1984), "The Rand Experiment and economical health care," letter to the New England Journal of Medicine, Vol. 310, No. 23., pp. 1528-1530.

Francis, Anita M., Polissar, Lincoln, Lorenz, Ann Browder (1984), "Care of patients with colorectal cancer: A comparison of a health maintenance organization and fee-for-service practices," Medical Care, Vol. 22, No. 5, pp. 418-429.

Gertman PM, Restuccia JD. (1981), The appropriateness evaluation protocol: a technique for assessing unnecessary hospital care. Medical Care, Vol 19. pp 855-870.

Hlatky, Mark A., Lee, Kerry L., Botvinick, Elias H., Brundage, Bruce H. (1983), "Diagnostic test use in different practice

settings: A controlled comparison," Archives of Internal Medicine, Vol. 143, pp. 1886-1889.

Keeler, Emmett B, Brook, Robert H, Goldberg, George A, Kamberg, Caren J, Newhouse, Joseph P. (1985), "How free care reduced hypertension in the Health Insurance Experiment." Journal of the American Medical Association, Vol. 254, No. 14, pp. 1926-1931.

Keeler, Emmett B., Sloss, Elizabeth M., Brook, Robert H., et al., (1987), "Effects of cost sharing on physiological health, health practices, and worry," Health Services Research, Vol. 22, No. 2, pp. 279-306.

LoGerfo, James P., Efird, Robert A., Diehr, Paula K., Richardson, William C. (1979), "Rates of surgical care in prepaid group practices and the independent setting: What are the reasons for the differences?" Medical Care, Vol. 17, No. 1, pp. 1-10.

Luft, Harold, S. (1981), Health Maintenance Organizations: Dimensions of Performance, John Wiley & Sons, Inc., New York.

Lurie, Nicole, Ward, Nancy B, Shapiro, Martin F, Brook, Robert H. (1984), "Termination from Medi-Cal -- Does it affect health?" New England Journal of Medicine, Vol. 311, No. 7, pp. 480-484.

Lurie, Nicole, Ward, Nancy B, Shapiro, Martin F, Gallego, Claudio, Vaghaiwalla, Rati, Brook, Robert H. (1986), "Termination of Medi-Cal benefits -- A follow-up study one year later." New England Journal of Medicine, Vol. 314, No. 19, pp. 1266-1268.

Manning, WG., Leibowitz, A, Goldberg, GA., Rogers, WH., Newhouse, JP. (1984), "A controlled trial of the effect of a prepaid group practice on use of services," New England Journal of Medicine, Vol. 310, No. 23, pp. 1505-1510.

Marquis, M. Susan, Davies, Allyson Ross, Ware Jr, John E. (1983), "Patient satisfaction and change in medical care provider: A longitudinal study," Medical Care, Vol. 21, No. 8, pp. 821-829.

Siu, Albert L., Sonnenberg, Frank A., Manning, Willard G., et al. (1986), "Inappropriate use of hospitals in a randomized trial of health insurance plans," New England Journal of Medicine, Vol. 315, No. 20, pp. 1259-1266.

Siu, Albert L., Leibowitz, Arleen, Brook, Robert H., et al., (1988), "Use of the hospital in a randomized trial of prepaid care," Journal of the American Medical Association, Vol. 259, No. 9, pp. 1343-1346.

Sloss, Elizabeth M., Keeler, Emmett B., Brook, Robert H., et al., (1987), "Effect of a health maintenance organization on physiologic health: Results from a randomized trial," Annals of Internal Medicine, Vol 106, pp. 130-138.

Steinwachs, Donald M, Weiner, Jonathan P, Shapiro, Sam, Batalden P, Coltin Kathy, Wasserman Fred. (1986), "A comparison of the requirements for primary care physicians in HMO's with projections made by the GMENAC," New England Journal of Medicine, Vol 314, No. 4, pp. 217-222.

Valdez, R.Buciaga, Ware Jr, John E., Manning, Willard G., et al., (1989) "Prepaid group practice effects on the utilization of medical services and health outcomes for children: Results from a controlled trial," Pediatrics, Vol. 83, No. 2, pp. 168-180.

Ware Jr., John E., Brook, Robert H., Rogers, William H., et al., (1986), "Comparison of health outcomes at a health maintenance organisation with those of fee-for-service care," The Lancet, Vol i, pp. 1017-1022.

Wilner, Susan, Schoenbaum, Stephen C., Monson, Richard R., Winickoff, Richard N. (1981), "A comparison of the quality of maternity care between a health maintenance organization and fee-for-service practices," New England Journal of Medicine, Vol. 304, No. 13, pp. 784-787.

Yelin, EH., Shearn, MA., Epstein, WV. (1986), "Health outcomes for a chronic disease in prepaid group practice and FFS settings: The case of rheumatoid arthritis," Medical Care, Vol. 24, No. 3, pp 236-247.

COMMUNITY HEALTH CENTRES

Allard, Robert, Guy, Micheline, Durand, Louise, Hudon, Elisabeth, Robert, Yves (1985), "Delays in the primary vaccination of children," Canadian Medical Association Journal, Vol. 133, pp. 108-110.

Battista, Renaldo N. (1983), "Adult cancer prevention in primary care: Patterns of practice in Quebec," American Journal of Public Health, Vol. 73, No. 9, pp. 1036-1041.

Battista, Renaldo N., Williams, J. Ivan, MacFarlane, Leslie, A. (1986) "Determinants of primary medical practice in adult cancer prevention," Medical Care, Vol. 24, No. 3, pp. 216-224.

Bozzoni, Luciano (1988), "Local community services centres (CLSCs) in Quebec: Description, evaluation, perspectives," Journal of Public Health Policy, Vol. 9, No. 3, pp. 346-375.

Freeman, Howard E., Kiecolt, K. Jill, Allen, Harris M. (1982), "Community health centres: An initiative of enduring utility," Milbank Memorial Fund Quarterly/Health and Society, Vol. 60, No. 2, pp. 245-267.

Ginzberg, Eli, Ostow, Miriam (1985), "The community health care centre: Current status and future directions," Journal of Health Politics, Policy and Law, Vol. 10, No. 2, pp. 283-298.

Okada, Louise M, Wan, Thomas T.H. (1980), "Impact of community health centres and Medicaid on the use of health services," Public Health Reports, Vol 95, No. 6, pp. 520-534.

Pineault, Raynald, Maheux, Brigitte, Lambert, Jean, Beland, Francois, Levesque, Anne (n.d. 1984) "Practice settings and physicians profiles: A comparison between physicians working in public-owned primary care centres and in private clinics in the province of Quebec," University of Montreal, Montreal (mimeo).

Pineault, Raynald, Champagne, Francois, Maheux, Brigitte, Legault, Claudine, Pare, Michele, (n.d. 1988a) "Determinants of health counselling practices in hospital: The patient perspective," Interdisciplinary Research Group, University of Montreal, Montreal, (mimeo).

Renaud, Marc, Beauchemin, Jean, Lalonde, Carole, Poirier, Hélène, Berthiaume, Sylvie (1980), "Practice settings and prescribing profiles: The simulation of tension headaches to general practitioners working in different practice settings in the Montreal area," American Journal of Public Health, Vol. 70, No. 10, pp. 1068-1073.

Sardell, Alice, (1983), "Neighbourhood health centres and community-based care: Federal policy from 1965-1982," Journal of Public Health Policy, December, pp. 484-503.

Scott, Neil (1989), "Community clinics: Renewed interest in a medicare mainstay," Regina Leader Post, July 27, p. A3.

Sheps, Sam, Robertson, Ann (1984), "Evaluation of primary care in a community clinic by means of explicit process criteria," Canadian Medical Association Journal, Vol. 131, October 15, pp. 881-886.

AN EVALUATION PROGRAM

Burkett, Gary L. (1982), "Variations in physician utilization patterns in a capitation payment IPA-HMO," Medical Care, Vol. 20, No. 11, pp. 1128-1139.

Denton, Frank T., Gafni, Amiram, Spencer, Byron G., Stoddart, Greg L. (1983), "Potential savings from the adoption of nurse practitioner technology in the Canadian health care system," Socio-Econ. Plan. Sci., Vol. 17, No. 4, pp. 199-209.

Drummond, M., Stoddart, G. and Torrance G. (1987). Methods for the economic evaluation of health care programmes. Oxford University Press, Oxford.

Evans, R.G. (1981), "Incomplete vertical integration: The distinctive structure of the health-care industry," in Health, Economics and Health Economics, J. van der Gaag and M. Perlman, eds., North-Holland Publishing Company, Amsterdam.

Green, Lawrence W., Erikson, Michael, P., Schor, Edward L. (1988), "Preventive Practices by Physicians: Behavioral Determinants and Potential Interventions," in: Implementing Preventive Services, American Journal of Preventive Medicine, Oxford University Press, pp. 101-107.

Hillman, Alan L., Pauly, Mark V., Kerstein, Joseph J. (1989), "How do financial incentives affect physicians' clinical decisions and the financial performance of health maintenance organizations?" New England Journal of Medicine, Vol. 321, No. 2, pp. 86-92.

Hornbrook, Mark C., Berki, Sylvester E. (1985), "Practice mode and payment method: Effects on use, costs, quality and access," Medical Care, Vol. 23, No. 5, pp. 484-511.

Inui, Thomas S., Belcher, Donald W., Carter, William B. (1981), "Implementing preventive care in clinical practice: I. Organizational issues and strategies," Medical Care, Vol. 38, pp. 129-154.

Johnson, Richard, E. Freeborn, Donald K., McCally, Michael, (1985), "Delegation of office visits in primary care to PAs and NPs: The physicians view," Physician Assistant, Vol. 9, No. 1, pp. 159-169.

Johnson, Richard E., Freeborn, Donald K. (1986), "Comparing HMO physicians' attitudes towards NPs and PAs," Nurse Practitioner, Vol. 11, No. 1, pp. 39-49.

Lairson, Paul D., Record, Jane Cassels, James, Julia C. (1974), "Physician assistants at Kaiser: Distinctive patterns of practice," Inquiry, Vol. XI, No. 3, pp. 207-219.

Luft, Harold S. (1985), "Competition and regulation," Medical Care, Vol. 23, No. 5, pp. 383-400.

Mitchell, Alba (1989), "Evaluation of midwives and nurse practitioners in the delivery of primary health care," Paper presented at The Second Annual Health Policy Conference, June 2, Centre for Health Economics and Policy Analysis, McMaster University, Hamilton, (mimeo).

Pineault, Raynald (1976), "The effect of prepaid group practice on physicians' utilization behaviour," Medical Care, Vol 14, No. 2, pp. 121-136.

Pineault, Raynald (1988b), "Discussion of Economic and Social Determinants of Prevention in Health Care Provision in the United States," in: Implementing Preventive Services, American Journal of Preventive Medicine (special supplement), Oxford University Press, pp. 101-107.

Record, Jane Cassels, Cohen, Harold R. (1972), "The introduction of midwifery in a prepaid group practice," American Journal of Public Health, March, pp. 354-360.

Ross, Catherine E., Duff, Raymond S. (1978), "Quality of outpatient pediatric care: The influence of physicians' background, socialization, and work/information environment on performance," Journal of Health & Social Behaviour, Vol 19, December, pp. 348-360.

Saward, EW. (1969). The relevance of prepaid group practice on the effective delivery of health services. Paper presented to the 18th Annual Group Health Institute, Sault St. Marie, June.

Spitzer, WO., Sackett, DL, Sibley, JC., et al., (1974), "The Burlington Randomized Trial of the nurse practitioner," New England Journal of Medicine, Vol. 290, No. 5, pp. 251-256.

Spitzer, Walter O. (1984), "The nurse practitioner revisited: Slow death of a good idea," (editorial) New England Journal of Medicine, Vol. 310, No. 16, pp. 1049-1051.

Wennberg, John E. (1985), "On patient need, equity, supplier-induced demand, and the need to assess the outcome of common medical practice," Medical Care, Vol. 23, No. 5, pp. 512-520.

Appendix A

Details of Controlled Studies

of HSO Performance

B.i. WORLD HEALTH ORGANIZATION/UNIVERSITY OF TORONTO STUDIES

These studies were conducted by Hastings and colleagues at the University of Toronto with support from Health and Welfare Canada and The World Health Organization (WHO) (Hastings et al, 1973, Mott et al, 1973). One study used a review of medical records to compare the utilization of medical and hospital services by SSM-GHA patients with patients of fee-for-service practitioners in Sault Ste. Marie (Hastings et al, 1973). The other study used a household survey to compare the health-care utilization and illness behaviour of GHA patients and patients of Sault Ste, Marie's fee-for-service doctors. The data for the study covered health-care utilization between July 1, 1967 and June 30, 1968.

GHA members had 24% lower hospital utilization but data sources did not permit conclusions about the use of physician services. The reasons for the lower use of hospitals included a lower rate of surgical procedures, (especially tonsillectomy/adenoidectomy and gynecologic surgery) and fewer readmissions. Some of the lower hospital use may have been due to GHA members being more likely to have had radiology and laboratory work on an outpatient basis. GHA members were more likely to have seen a physician in the 12 months period of the study and to have had a routine examination (e.g. annual physical examination) or an immunization.

The household survey compared utilization rates of a sample of persons who had been GHA members for one year or more to the rates of utilization for a sample of persons who were enrolled in a third party reimbursement plan offered by Prudential Insurance Company. The results showed that there were no significant differences between the two populations in demographic variables or health status. However, the GHA members had 25% fewer separations and 16% fewer hospital days than enrollees in the insurance plan. The surgery also indicated that the GHA members

were less likely to have undergone surgery. GHA members reported more of their care from one location (i.e. GHA) but less of their care from one specific physician.

Both studies involved were cross-sectional comparisons which are susceptible to several sources of bias, in particular the differences in the two patient populations and/or the two physician populations. These differences cannot necessarily be attributed to the different methods of payment (capitation versus fee-for-service) or the different organization of practice (group versus largely solo practitioners). However, the groups studied were, in general, steelworkers and their dependents living in one community. Furthermore, no differences in demographic or health-status variables were found, neither were there any significant differences in ambulatory or hospital insurance coverage (Muldoon, 1988). Furthermore the GHA at that time had no financial incentive to lower hospital costs.* Indeed if the observed lower levels of hospital utilization were achieved partly by higher levels of ambulatory care, then this reflected a financial penalty to the GHA. It is likely, therefore, that the lower levels of hospital utilization reflected the organization of practice, the practice style of the physicians at GHA, and, probably, a 'corporate culture' within the GHA that was originally designed for a payment system which rewards substitution of ambulatory for institutional care.

B. ii. UNIVERSITY OF MICHIGAN/UNIVERSITY OF TORONTO STUDY

This study compared the utilization levels of patients attending the GHA, the St. Catharines and District Community Group Health Foundation (SC), and six Ontario Health Services Insurance

* The Hastings study was conducted before the advent of universal, public insurance for physician services but after the implementation of universal public hospital insurance.

Plan (OHSIP) employee groups in two Northern and four Southern Ontario communities which only had FFS practitioners. The six FFS groups were chosen from those which had voluntary comprehensive medical insurance prior to medicare and since its advent, had been registered as OHSIP groups.

This study showed a lower hospital use for the SC (19%) but the GHA had similar results to the FFS communities. It was not possible to determine accurately the costs of physicians services and, therefore, the total costs of health-care services.

There are several caveats to these findings. Firstly, the hospital utilization data were not adjusted for the different age profiles of the populations. The SSM-GHA and the SC had more people over 65 years of age. In particular, 2.9% of the GHA's males were 65 or over while less than 0.5% of the FFS males were 65 or over. This group had higher hospital utilization and their exclusion from the analysis leads to the GHA group having less hospital utilization. Secondly, the FFS comparison groups were based on employed persons. Most of the GHA patients were originally members of the United Steelworkers of America union at Algoma Steel Corporation or their dependents. However, the GHA always accepted members of the community as patients and, after the advent of medicare in Ontario (October 1, 1969), many of the GHA patients were neither employed persons nor dependents of such persons.

As a result the comparison is subject to bias arising from the "healthy worker effect", i.e. healthier member of the population tend to be selected for employment and are more likely to continue in employment. The effect is found to extend to dependents of family heads who are employed versus those who are not employed. This bias would lower the utilization of the FFS groups artificially compared to the GHA and the SC as well as the Province as a whole.

Thirdly, Sault Ste. Marie had one of the highest rates of hospital utilisation in the Province at the time of the study, but the SSM-GHA was compared with communities in other parts of the Province as opposed to patients under FFS provision in the same community. Reference has already been made to the effect of local factors on the utilisation of health care. The comparison failed to consider or control for the influence of local, often idiosyncratic, factors which can have as much impact on hospital utilisation as specific differences in organisation or financing of health care.

Fourthly the survey was conducted in 1971, two years after the introduction of universal, public medical insurance. Sault residents could now select physicians for each episode of illness. Non-GHA physicians were responsible for 20% of the GHA admissions to hospital. The length of stay for these admissions was substantially longer than the other 80% of the admissions (9.6 days versus 8.1 days). At least some of the persons who were admitted by non-GHA doctors were probably not GHA patients. The inclusion of these persons as GHA patients again biases the GHA hospitalisation rate upward. Ironically, a similar bias operates to favour the results for the St. Catharines facility. The SC had derostered 3075 people (about 35% of its capitation roster) immediately before the study because they made extensive use of other providers for which the clinic was charged. It could be argued that it was appropriate not to include these persons in the analysis but, as they tended to be high users of services, there may have been a bias introduced into the results which reduced the SC hospital utilisation figures.

As a result of these problems with the study design, the reported results concerning the effects of different modes of payment or organisation are confounded by the effects of age, location, employment status, and selection in group assignment.

B.iii. DeFRIESE STUDY (DeFrieese, 1974, 1975)

In this study a random sample of 1503 households in Sault Ste. Marie were surveyed in Spring, 1973. Respondents were classified as users of either fee-for-service (FFS) doctors, almost all of whom were in solo practice, or of the GHA, or as users of both facilities, depending upon their pattern of care seeking. The results showed that the users of GHA had less hospital utilization (19%) and fewer admissions than the persons who attended FFS practitioners primarily. The utilisation experience of persons with mixed utilisation was close to that of the pure FFS group. These results were similar to those found by Hastings (1973) and Mott (1973) using data collected five years earlier.

DeFreise also confirmed some of the earlier results on the organisation of care. Persons attending FFS doctors were more likely to report seeing the same doctor for all episodes of care and reported greater ease in speaking to a physician by telephone. However, persons attending the GHA were more likely to report ease with logistic aspects of seeking care (e.g. less waiting time to see a doctor, more convenience of lab and x-ray testing, and easier parking).

DeFrieese also investigated aspects of quality care. He found that female patients of the GHA were more likely to have had a 'comprehensive' physical examination. Comprehensive was defined by the number (out of six) of procedures of the physical examination which were done on the most recent physician visit. Although the definition of comprehensiveness could be challenged, it did appear that GHA physicians were not underservicing their patients with regards to the physical examination.

The study was based on a cross-sectional design and therefore prone to the same problems as discussed for the Hastings (1973) and Mott (1973) studies above. However, the populations studied were

similar and the sampling was based on equal proportions of households being drawn from 15 different types of accommodation as identified by the city's tax rolls (i.e. a stratified sample).

B.iv. ONTARIO MINISTRY OF HEALTH ST. CATHARINES/BRANTFORD STUDY (1976)

In this study the health services utilisation and clinical performance of 'primary users' of service at the St. Catharines Clinic and the Brantford Clinic were compared. Primary users were defined as persons using one of the clinics for 60% or more of their ambulatory care. The investigators compared the hospital utilization of the two clinics directly but not the medical services provided. Rather, the costs to the Ontario Health Insurance Plan (OHIP) in the form of fee-for-service payments to the Brantford facility, were compared with the Ministry of Health grant to St. Catharines. It was not possible to identify the hospital laboratory, x-ray, and outpatient services provided to Brantford patients so the results were presented with and without these data for the two groups. Finally, physicians at both clinics cooperated with the investigators to develop a protocol for evaluating the quality of care provided for six 'tracer' conditions (institutional diabetes management, ambulatory diabetes management, cholelithiasis, myocardial infarction, well-baby care, and perinatal care).

The St. Catharines patients tended to be younger than the Brantford patients so the data on hospital utilization were adjusted for age and gender. The St. Catharines patients were shown to use 20% fewer hospital days per capita with a 10% lower rate of admission. The estimated per capita cost of hospital care was 22% lower (\$76.16 vs. \$97.80) for the St. Catharines patients. However, the estimated costs of insured medical services, without including lab, x-ray and hospital outpatient services, were \$104.38 and \$61.84 at the St. Catharines and Brantford Clinics respectively

so the total costs were estimated to be approximately 12% higher at St. Catharines (\$180.54 vs. \$159.64).

There were many problems with the cost estimates however. Firstly, hospital costs were estimated using combined 'per diems' for the hospitals in the two communities which are essentially based on average costs over all patients. (for further details of the limitations of using hospital 'per diems' see Drummond *et al.* 1987).

Secondly, the St. Catharines facility had been sponsored by the United Auto Workers of America. Management was eager to provide generous wages and benefits to their employees. The study estimates that the non-medical staff were paid 30% more at the St. Catharines Clinic than at the Brantford Clinic. Furthermore, the Brantford Clinic's building has been paid for many years before the study while the St. Catharines Clinic had a substantial mortgage. Hence the comparison did not use a consistent approach to imputing the opportunity cost of the facilities.

Thirdly, with the exception of the age profiles of the populations no other data were presented comparing the demographic or health-status characteristics of the populations. For example, if the St. Catharines Clinic population had more employed heads of households (a possibility given the involvement of the United Auto Workers), then the St. Catharines hospitalisation results may have been lowered artificially by the healthy worker effect noted above. The study also compared only users of the services. Patients who used no services during the year were not included in the analysis. It is plausible that St. Catharines had more non-users than Brantford because the clinic's funding was based on a line budget with no financial incentive to see patients. However, over the course of a year 85-90% of true patients would have been seen.

Physicians were used to rate the charts of patients with the six 'tracer' conditions mentioned above. Separate aspects of the care were rated individually and then a global rating was given for the care of that patient. Two raters (one general practitioner and one specialist) were used for each condition. Inter-rater reliability was poor, but because the same raters rated both clinics' patients, between group bias is unlikely. The results of this quality-of-care audit showed higher quality care at the St. Catharines facility. The global ratings for five of the conditions were statistically significantly higher at St. Catharines. In addition most of the process ratings for cholelithiasis, well baby care, and perinatal care were also statistically significant better at the St. Catharines Clinic. However much of the difference in the ratings of quality care may have been due to the much better record keeping of the St. Catharines Clinic.

B.v. MINISTRY OF HEALTH SSM-GHA/GLAZIER CLINIC STUDY

In this study the utilisation of health services by patients at the SSM-GHA and the Glazier Medical Centre, a large group practice in Oshawa, were compared. The study was originally designed to measure quality of care as well, however, only an interim report was published which examines six months of utilisation data (Ontario Ministry of Health 1974). As with the St. Catharines study, this report investigated the service utilisation of 'primary users', defined as those persons who had used at least one service between July 1, 1973 and December 31, 1973 and received at least 60% of their ambulatory care from their respective facility.

The study found a marked difference in hospital utilisation of the two patient groups. The SSM-GHA primary users had 56% more hospital days after adjustment for age and gender differences because the study only compared users of service over a six month period however, the comparison was essentially between heavy users

of both clinics only. If the GHA tended to see healthy people less frequently then the populations under the study were unlikely to be comparable. The investigators originally identified all persons who had used some services at either facility over the six month period and then eliminated from the data those who received less than 60% of their ambulatory care from the clinic. This resulted in the censoring of 8% of the GHA users but 62% of the Glazier Centre's users. This may well have eliminated heavier users of care from the GHA. In particular there was a slight increase in the overall proportion of GHA primary users who were elderly (9.1% vs. 8.8%) but there was a substantial drop in the proportion of the Glazier Centre primary user group who were elderly (5.5% vs. 7.5%) Even though the utilisation data were age adjusted, there are good reasons to believe that substantial biases were introduced into the Glazier sample by censoring 62% of their patients.

In view of these design problems, the results of the study are, at best, tentative. As the investigators noted, "The primary population identified as those patients who received 60% or more of their total ambulatory care from the clinic physicians has not proven to be a satisfactory population base for comparative purposes." (Ontario Ministry of Health, 1974, p.iii).

B.vi. WOLFSON STUDY (Wolfson 1981)

In this study Wolfson compared the health service utilisation for a sample of GHA capitation patients (which excluded those for whom GHA had submitted a fee-for-service bill to OHIP) with the utilisation of Sault Ste. Marie residents who had been serviced exclusively by the FFS sector. The study used data for the period July 1 to December 31, 1978. GHA patients who had not used any services over the six month period were included but the FFS group consisted of patients who had used at least one service during this time period.

The results showed that the GHA patients used 22% more physicians services. It was estimated that this represented a cost difference of \$22.58 per person. On the other hand, the GHA patients used 30% fewer hospital days than the FFS comparison group.

As with the other studies, however, the two groups of patients were likely to differ in a number of ways which would affect health service utilisation. As in the Ministry of Health SSM-GHA/Glazier Clinic Study, a six month period is too short to include all true patients of a practice. In particular it excludes infrequent or light users of service. Wolfson used research from Saskatchewan which indicated that 85-90% of persons use medical services within a given year, but the corresponding figure for a six month period would be less. Exclusion of non-users from the FFS group would bias this group's hospital utilisation upwards. It is difficult therefore, to draw conclusions from this study.

B.vii. UNIVERSITY OF TORONTO STUDY OF ONTARIO GROUP PRACTICES

In this study Ontario group practices were surveyed between November, 1986 and May, 1987 (Vayda et al. 1988). The study covered community health centres health service organisations and FFS groups. Although the survey did not cover the utilisation of services it did ask questions about the organisation and delivery of care. The results showed that CHCs and HSOs were more likely to have recall systems for immunization (63% vs. 13%) and pap smears (64% vs. 30%) compared to the FFS groups, but the data were not disaggregated into HSOs and CHCs separately .

B.viii. LOMAS/ABELSON SURVEY OF CHCs, HSOs AND FFS PRACTICE

In this study persons at 23 FFS practices, 19 HSOs and 11 CHCs were interviewed to ascertain approaches to disease prevention and

health promotion. Few significant differences were found between the delivery modalities regarding attitudes towards prevention, presence of recall systems for screening, knowledge of, compliance with, or estimated coverage for selected recommendations of the Canadian Task Force on the Periodic Health Examination. The variability within the different groups appeared to be as great or greater than the variability between groups. There were trends (largely non-significant) for HSOs and CHCs to be more likely to have recall systems for routine screening procedures; for CHCs to be less likely to deliver ineffective or dubiously effective preventive manoeuvres; and for CHCs to be more likely to have an explicit policy on prevention. CHCs also reported a significantly greater variety of formal health promotion programmes and were more likely to make these programmes available to the general community (as opposed to restricting these to their own patients). CHCs also appeared to be more likely than the other modalities to hire a variety of non-physician personnel to deliver disease prevention and health promotion activities.

The authors of the study noted that the results should be interpreted cautiously because they are based on self-report (which usually over-estimates actual performance) and the definition of disease prevention was restricted to the evidence appraised by the Canadian Task Force on the Periodic Health Examination. In addition the small sample provides only limited power. Thus the trends observed might have been statistically significant in a larger study.

Appendix B

Summary of the Rand Health Insurance

Experiment (HMO Portion)

B. THE RAND HEALTH INSURANCE EXPERIMENT (HIE)

B.i. INTRODUCTION

Although the Rand Health Insurance experiment was primarily concerned with the estimation of the responsiveness of health-service utilisation to the user price, the design of the study included service utilisation under both FFS and capitation based modalities. The researchers were therefore able to consider the impact of delivery modality on the utilisation of health-care and patient health status. The random allocation of patients among delivery modalities avoided bias through patient self-selection.

Over 1600 persons were randomly allocated to receive their health care from either the Group Health Cooperative of Puget Sound (a Seattle based pre-paid group practice HMO) or FFS providers in the Seattle area. The FFS group included those who had free care and those who had to pay at the time of service. There were three cost-sharing groups. Two groups had to pay for 25% or 95% of their health-care bills up to a family maximum of \$1000 (less for poor families). The other group paid for 95% of the costs of outpatient care up to a maximum of \$150 per person or \$450 per family. A further comparison group was constructed of a random selection of persons who were existing patients at the Group Health Cooperative as of 1976 and otherwise met the inclusion criteria defined below.

The study persons had to be less than 62 years of age at enrolment in order to be eligible for participation. Other exclusion criteria included those with family incomes of greater than \$56,000 (1983 US), those who were institutionalized, members of the military, veterans with service-related disabilities and those eligible for US Medicare disability or end-stage renal-dialysis programs. The family income cut-off excluded about 1% of otherwise eligible participants.

The participants at the Group Health Cooperative of Puget Sound (GHC) received all of their care at GHC without any user charges. If the service (eg. chiropractics) was not offered at the GHC it was paid for by the HIE. If, however, the participant used outside services which were available at the GHC without a referral the patient was responsible for 95% of the costs.

Because the patients were allocated randomly there were only minor differences between the patient groups on measurable characteristics and there were unlikely to be any significant differences on unmeasurable characteristics which could affect health status. Some of the participants were followed for three years while others were followed for five years.

B.ii. ECONOMIC OUTCOMES

Figure B-1 shows the overall economic outcomes for the HMO-FFS comparisons from the experiment, taken from Manning et al (1984). The average cost of the patients enrolled in the GHC was 28% less than the costs per patient in the FFS plan.

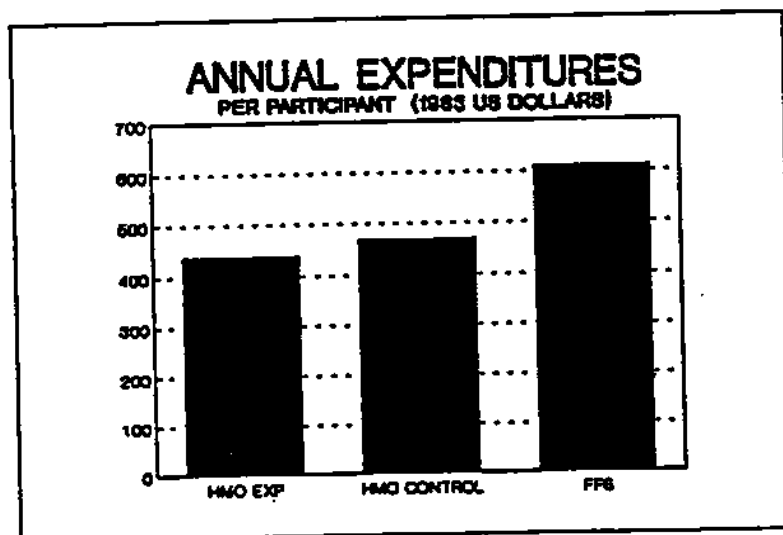


Figure B-1. Annual expenditures per participant . Differences between the HMO groups and FFS are significant at $p < 0.05$.

Lower hospital use was largely responsible for the lower total cost. Figure B-2 shows that the GHC groups used almost 50% fewer hospital days than the FFS group. A later study by Siu et al. (1988) examined the medical records to determine the appropriateness of hospital admissions in the experimental GHC and FFS groups. A single physician used the Appropriateness Evaluation Protocol, a previously validated and reliable instrument (Gertman and Restuccia, 1981), to determine whether the acute hospital was an appropriate setting for the delivery of the care. Seven pairs of physicians subsequently reviewed the records to determine the medical appropriateness of the therapy. For this study, the investigators excluded some types of hospitalization because of inconsistent policies regarding release of hospital records or other methodological problems.

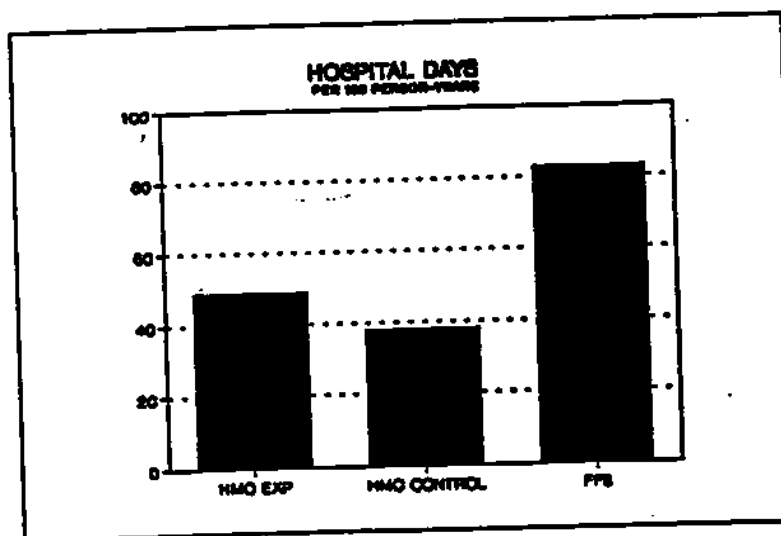


Figure B-2. Hospital days per 100 person-years. Differences between the HMO groups and FFS are significant at $p < 0.05$.

PREDICTED RATES OF HOSPITAL ADMISSIONS FOR DIFFERENT CATEGORIES OF ADMISSIONS

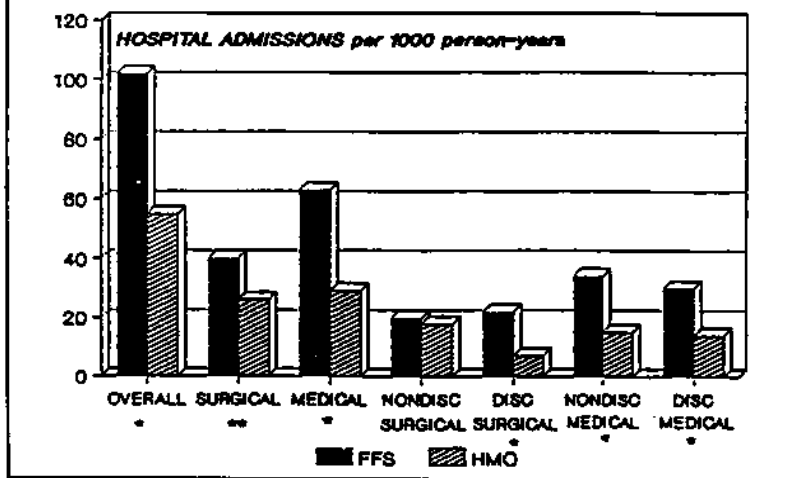


Figure B-3. Hospital admission rates. Disc = discretionary.

* P < 0.01 ** P < 0.05

Figure B-3 shows the results of the Siu (1988) study. Surgical, medical, discretionary surgical, discretionary medical, non-discretionary surgical and the overall number of admissions were significantly lower for the HMO group. The authors commented that there were no indications that these differences were due to better health status of the GHC participants or better preventative care by the HMO.

Figure B-4 shows that the number of patient encounters was similar between the GHC groups and the FFS free group.

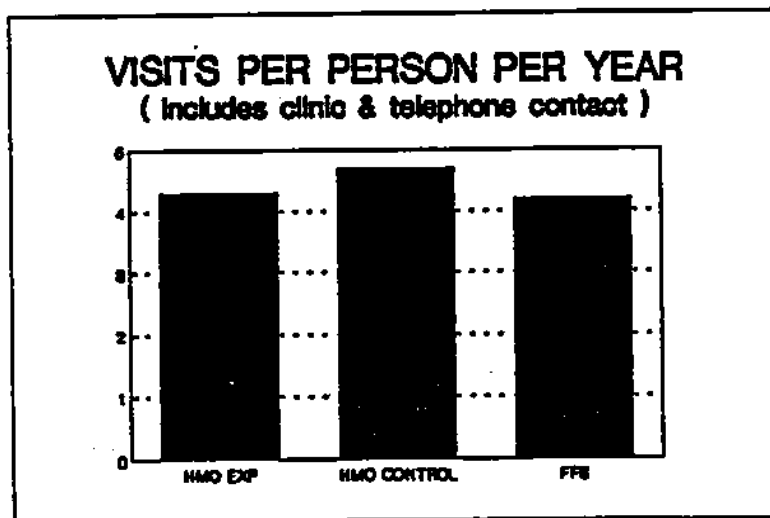


Figure B-4. Ambulatory visits

B.iii. HEALTH-STATUS OUTCOMES

The overall health status of the HMO and FFS groups were similar at the end of the trial. There were some differences in certain subgroups. In particular higher income patients who started the study in poor health had slightly better health outcomes from the HMO while low income patients who started the study in poor health had slightly poorer outcomes from the HMO. The HMO higher income patients who were initially in poor health had lower cholesterol levels and better perceptions of their health than the free FFS patients. The HMO lower income patients who were initially in poor health had more disability days and complaints of serious symptoms than the free FFS patients. They also had a greater calculated risk of dying, based on the observed levels of systolic blood pressure, serum cholesterol and smoking patterns.

B.iii.a. OUTCOMES FOR THE LOWER INCOME, INITIALLY 'AT RISK', SUBGROUPS

Lower income was defined as a family in the lowest fifth of the family income distribution. 'At risk' or 'initially poor health' was defined as someone in the top fifth of the risk factor (or calculated risk of death) distribution.

No statistically significant differences were observed between the HMO and free or user charge FFS subgroups regarding 26 selected health habits and physiological measurements. The calculated risk of death was statistically significantly greater, however, for the HMO than for the FFS subgroup which required cost sharing. This effect was due to non-statistically significant trends in favour of the FFS user charge subgroup for cigarette smoking, cholesterol, and blood pressure. There was a smaller, non-significant difference between the risk of death for HMO and free FFS patients.

Interestingly, Ware et al. (1986) found that the free FFS subgroup did worse than the user charge FFS subgroup. Although this difference is not statistically significant in itself, it runs counter to the health outcomes reported between the different FFS groups in the whole of the FFS experimental population (Brook et al. 1983).

Brook et al. (1983) compared all the FFS patients from the experiment in all parts of the United States (nearly 4000 patients). The risk of death was statistically significantly lower for the low income persons with initially poorer health who were enrolled in the free FFS plan compared to those who were enrolled in the user charge FFS plans. This was primarily because of lower blood pressure in the free FFS group. Keeler et al. (1985) found that this was due to better detection and treatment of hypertensives who were initially not under care and higher compliance with medication, diet and smoking cessation. This result is consistent with other literature on the adverse health consequences of user charges (eg. Lurie et al. 1984, 1986).

B.iv. DELIVERY OF PREVENTIVE SERVICES

HMO patients were observed to consume more preventive services. Figure B-5 shows that the number of preventive visits* was statistically significantly higher in the GHC groups than the FFS plan.

* These included well child care, immunizations, screening examinations, routine gynecologic and physical examinations, and visits involving pap smears. These excluded visits for prenatal care and vision and hearing examinations.

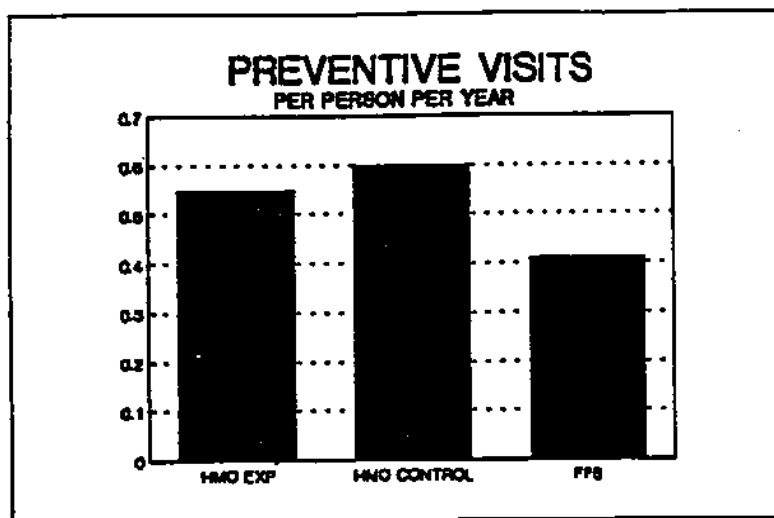


Figure B-5. Preventive visits. Differences between HMO and FFS groups are significant at $P < 0.05$.

However, Luft (1981), Pineault (1988b), and others have raised concerns about the appropriateness of the definition of 'preventive services'. Further, the effectiveness and efficiency of many preventive manouevres are at best, in question (e.g. population-wide screening for cholesterol, periodic x-rays for heavy smokers).

B.v. PATIENT SATISFACTION

Overall satisfaction was lower for HMO than FFS patients. Furthermore HMO patients' satisfaction was statistically significantly lower for eight out of fifteen measures of satisfaction and higher-income persons were more likely to be dissatisfied with the HMO than lower income patients. Some of the results may be due to certain idiosyncrasies of the Group Health of Puget Sound at that time. For example, patients were often kept 'on hold' on the telephone for over twenty minutes to make an appointment. However, other types of dissatisfaction may be due

to the practice style of the HMO which is integral to the HMO's cost savings.

HMO patients thought their doctors less technically proficient because they didn't perform as many investigations as FFS doctors. This effect was particularly strong among the higher-income patients. Further support for the potential for this effect is seen in the studies by Francis et al. (1984) and Hlatky et al. (1983). In Francis's study of colon cancer patients in the Seattle area, the eventual care provided was the same, as were 1 and 4 year rates of survival. However, the HMO physicians were less aggressive in their initial approach. HMO patients had their surgery an average of 47 days after the first contact with a physician while the FFS patients had their surgery an average of 40 days after contact with their physician. Approximately 90% of patients in both HMO and FFS groups had surgery.

Hlatky et al. (1983) found that HMO based cardiologists were less aggressive than FFS physicians in their diagnostic work-ups of simulated patients. However, the HMO cardiologists tended to agree with a panel of university-based cardiologists.

Whether it is the effect of economic incentives or simply a more conservative style of medical practice, HMO doctors appear to be less aggressive in their investigations and their interventions. This may present problems for certain patient groups (eg. the higher income patients) who might equate 'more' with 'better'.

B.vi. OTHER STUDY LIMITATIONS

Although the Rand Health Insurance Experiment was based on a randomised design, it investigated only one HMO. The particular characteristics of the Group Health Cooperative of Puget Sound which may be important for its performance include:

- * It is a large pre-paid group practice which serves approximately 350,000 people in Washington State from a

network of ambulatory care facilities and owned or affiliated hospitals.

* It is governed as a non-profit cooperative and has strong roots in the movement of the post-World War II period which promoted pre-paid group practice.

* It has an in-house research unit with eight senior investigators and over fifty support staff.

* Clinical policies are developed to deal with specific issues, eg. cholesterol screening. There is also considerable review of the physicians' activities by physicians and pharmacists.

* The utilization of substitute non-physician personnel is less than the scientific literature would warrant.

The validity of the findings for the purpose of comparing alternative delivery modalities is limited by the exclusion of the chronically ill, or the elderly from the experimental population. Many of the proportionate differences in health-status outcomes in the study were clinically significant but the patient numbers were too small for statistical significance. One reason why these differences did not achieve statistical significance is that many of the adverse outcomes were rare in this healthy adult population. Theoretically, had those persons who have higher baseline rates of adverse outcomes (such as the elderly) been included in the study, the statistical capability may well have been present to detect truly important effects.