RESEARCH REPORT

INDEPENDENT PHYSICIANS AND CLINIC PHYSICIANS IN KUPAT HOLIM CLALIT: THE IMPACT ON HEALTH CARE EXPENDITURES

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ABSTRACT

Kupat Holim Clalit is Israel's largest sick fund, with approximately three and a half million members. Approximately 95% of its members receive their primary care in community clinics while approximately 5% receive their primary care in the private office of an "independent physician".

Kupat Holim Clalit (KHC) currently faces a number of major policy decisions regarding the future organization of its primary care services, including whether to expand the independent physician (IP) program and whether to develop intermediate forms between the IP and clinic models. The principal objective of this paper is to contribute to the managerial decision-making process by comparing the health costs associated with these two methods of primary care provision. This paper is part of a larger research program which also reviewed the historical development of the IP program and compared the patient satisfaction and quality implications of the two models of primary care provision.

Kupat Holim is addressing the question of the future organization of its primary care services in a context characterized by growing competition from the smaller sick funds, increasing budgetary pressures, and large-scale immigration. The working hypothesis of KHC's senior management has been that expanding the independent physician program could be a very effective way to improve patient satisfaction and attract additional members, but that the program is prohibitively expensive. This fear derives from several incomplete studies carried out internally over the past two decades. Accordingly, a comprehensive, in-depth study comparing the cost of IP and clinic care could have a major impact on KHC's primary care policy.

This paper compares 1989 health expenditures generated by clinic patients with those generated by patients cared for by independent physicians in the Rishon Lezion region, which is one of several KHC regions with developed IP programs. The analysis focuses on the four largest components of direct service expenditure, which together account for 80% of total sick fund expenditures: inpatient care, hospital-based outpatient services, community-based services (including the cost of community-based physicians), and pharmaceuticals. Adjustments are made for differences between the groups in patient and physician characteristics. The analysis is based primarily on administrative records maintained by the sick fund, and involved linkage of several data sets.

In terms of the raw data, IP patients have lower hospital use rates than clinic patients, both in terms of admissions and patient-days. However, adjusting for differences in patient and provider characteristics eliminates most of the IP-clinic difference in admissions and part of the difference in patient days.

The annual cost of community-based care is $102 in the IP setting and $75 in the clinic setting - a difference of 36%. The IP program is also somewhat more expensive than the clinic program with regard to hospital-based outpatient services ($53 v. $46) and pharmaceuticals ($38 v. $31). On the other hand, IP costs are lower in the inpatient area - $137 v. $142. When purchased services and overhead are included along with the four main components of operating costs, *total* health expenditures for the average IP patient are only 10% higher than for the average clinic patient - $401 v. $366. In order to eliminate the IP-clinic community-based care cost differential (and reduce the total cost differential to one-fourth of its current magnitude) by reducing the IP capitation rate, a 44% reduction would be required.

The IP program is more expensive than the clinic care program, even when the same physicians are involved in the two settings. Almost half of the physicians working as IPs in the Rishon Lezion region also work in the region's primary care clinics. Total cost among patients cared for by physicians working in both settings is $386 in the IP setting and $351 in the clinic setting. Primary care costs are markedly higher in the IP setting, but this effect is diluted somewhat by the fact that

expenditure levels in other areas -particularly inpatient services - are roughly equal.

These findings underscore the importance of looking beyond primary care costs in analyzing the expenditure impact of various primary care programs. As hospitalizations and hospital-based outpatient care account for the majority of health care expenditures, relatively small percentage differences in hospitalization costs can offset major differences in primary care costs. Even if hospital-related costs prove to be equal among the programs being compared, including them in the analysis can serve to moderate the impact of primary care cost differences upon total expenditures *in percentage terms*.

Despite the fact that the IP program is more expensive than clinic care, it may, nonetheless, be profitable for KHC to expand the IP program. If expansion of the IP program improves KHC's competitive position and leads to a growth in KHC membership, the increase in costs could be more than offset by an increase in revenues. The profitability of expansion depends on both the income levels of the new members (as this influences the level of their membership dues) and their health status (as this influences their utilization rates and hence their cost to the sick fund). Recent changes in the parallel tax law have weakened, but not removed, these links between patient income levels, patient health status, and sick fund profitability.

The study's findings suggest that the manner in which the IP program is staffed can have implications for health care expenditures. In comparison with those IP patients whose physicians are employed in KHC clinics, IP patients whose physicians do not work in the clinics were associated with higher average total costs - $411 v. $386. Differences in outpatient costs and pharmaceutical costs are the critical factors in explaining the overall difference between the two IP groups. Most of the IPs who are not employed in the clinics work primarily as hospital-based physicians, and this may have influenced them to adopt a more expensive pattern of care. However, the difference in average total costs should be interpreted cautiously, as the cost differential could be due to the greater ability of physicians working in both settings to select healthier patients for their IP practices, rather than differences in treatment patterns.

The study also demonstrates that it is possible to carry out low-cost, reasonably valid analyses regarding hospital inpatient and outpatient expenditures using existing data sources. KHC management should note that existing data systems within the sick fund constitute a relatively unexploited source of information for planning and program evaluation.

The analysis presented in this paper was carried out over the course of 1989; in the case of several of the cost elements, the analysis relies on data from years prior to 1989. The economics and organizational characteristics of the health care system are constantly changing. Therefore, decisionmakers may need to adjust the findings presented here to reflect recent developments.

ACKNOWLEDGMENTS

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1 INTRODUCTION

Kupat Holim Clalit (KHC) is Israel's largest sick fund. It serves as the principal insurer for approximately three-quarters of the nation's population. It also owns and operates approximately one-third of the country's acute care beds, a network of over 1,300 primary care clinics, and a large number of laboratories, radiology centers and specialty clinics. Kupat Holim Clalit is owned and operated by the Histadrut - Israel's powerful labor federation.

The community clinic currently serves as the principal site for the provision of primary care in KHC. The clinic brings together - under one roof - professionals from a variety of disciplines and puts at their disposal basic diagnostic and therapeutic equipment. The care of each patient is supposed to be coordinated by a physician who is a salaried employee of KHC. The underlying objective of the clinic is the provision of comprehensive, community-oriented care. KHC has a long tradition of commitment to community clinics as the preferred setting for providing primary care services.

In 1987 close to 164,000 KHC members (approximately 5% of the total membership) did not receive their primary care in clinic settings (Kupat Holim Clalit, 1988). Instead, they received their care from independent physicians (IPs) in the IPs' private offices. The prevalence of this alternative model of primary care has grown steadily since 1971 (Yuval et. al., 1991).

Differences between the two methods of primary care provision

IP care and clinic care--the two practice modes--differ along three key dimensions:

1. **The nature of the contractual relationship between the physician and the sick fund.**

Clinic physicians are sick fund employees, whereas those working in the IP program are contractors whose contracts are reviewed annually.

2. The method of physician reimbursement.

The IP physician is reimbursed on a capitation basis; his compensation depends on the number of patients on his roster. In contrast, the primary component of the compensation of clinic physicians is "salary" - it depends on the number of hours worked and not on the number of patients enrolled with the physician. Since KHC does not guarantee IPs a minimum number of patients and as the IPs assume responsibility for their practice expenses, IPs bear substantially greater risk than their counterparts in the clinics.

3. The practice setting.

Here there are four aspects to consider:

a. The place of work: Most IPs work out of offices which they own or rent, whereas clinic physicians work in premises owned by the sick fund.

b. The number of sources of care: Every KHC member, whether he is cared for by an IP physician or a clinic physician, is affiliated with the clinic in his neighborhood. Even patients cared for by IPs must depend on the clinic for a variety of administrative and clinical needs (referrals, nursing care, laboratory services, etc.) Accordingly, these patients must interact with both their IPs and the clinics.

c. Organizational affiliation: While each IP is officially assigned to a "base clinic", in practice they report primarily to the regional management, not the director of the "base clinic". In addition, since most IPs have patients from several clinics, they must interact with several different clinic managements.

d. Relationship with other health care professionals: While a small number of IPs work in group practices, most work alone. [1] In contrast, most clinic physicians work alongside several peers and with nurses.

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[1]Recently, KHC adopted a new policy which stipulates that no new IP contracts will be issued to solo practitioners. However, it will be a while before group practice becomes the prevalent form among the IP physicians.

Until recently, the two models differed along yet another dimension - the extent to which patients could choose their physician. In the IP framework, the patient could choose any independent physician working in the region while in the clinic framework patients were restricted to the physicians working in the community clinic located in their service area. In many clinics patients were even assigned to a particular physician by the clinic secretary. Recently, freedom of choice within the clinics has been expanded.

The growth of the IP program

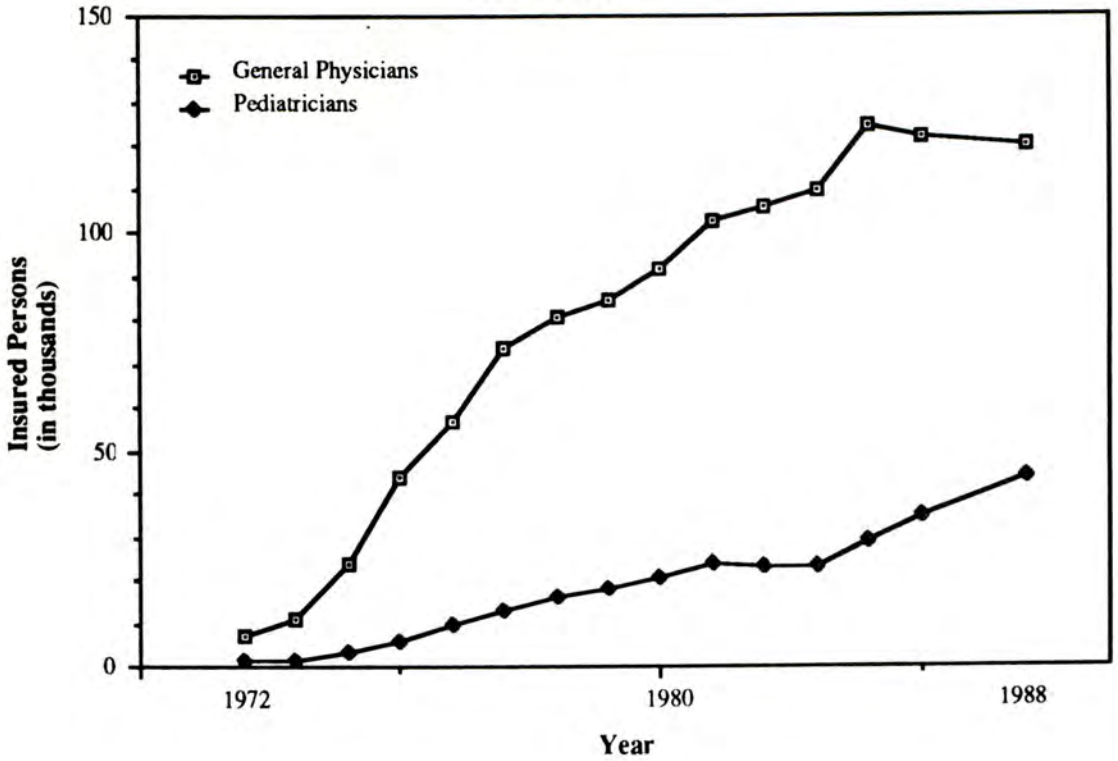
The smaller sick funds with which KHC competes have based their service network primarily on contracts with physicians who work out of their private offices. In fact, KHC officially began its IP program in 1971 primarily in response to the competitive threat from the smaller funds. The post-1967 economic boom brought with it rising expectations and increased emphasis on consumerism. Some groups of patients began to demand the privacy and personal attention which are more readily available in private office settings than in community clinics. The IP program grew steadily until 1984, when it was curtailed because of the financial crisis at KHC and the perception that the program was costly and something of a frill.

In 1987, when it became clear that many younger and more educated persons were opting for the competition over KHC, top management once again became very interested in the future of the IP program. Figure 1 depicts the development of the IP program between 1982-1988 - a development which was influenced by changes in supply and demand as well as by KHC policy decisions. Cost considerations have played an important role in past decisions about the size of the IP program and such considerations are likely to continue to play a role in the future (Yuval, et. al., 1991).

Figure 1

Number of Persons Enrolled with KHC IPs

1972-1988



Kupat Holim Clalit currently faces a number of major policy decisions regarding the future organization of primary care within KHC, including whether to expand the IP program and whether to develop intermediate forms between the IP and clinic models. The principal objective of this paper is to contribute to the managerial decision-making process by comparing the health expenditures associated with the two methods of primary care provision. This paper compares the health expenditures generated by clinic patients with those generated by patients cared for by independent physicians in the Rishon Lezion region. The analysis is based primarily on existing computerized data sets which were assembled for ongoing administrative purposes by KHC. This paper is part of a larger research program which also reviewed the historical development of the IP program and compared the satisfaction and quality implications of the two models of primary care provision (Yuval, et.al., 1991).

2 THEORY AND PREVIOUS RESEARCH

The working hypothesis of KHC's senior management is that expansion of the independent physician program could be a very effective marketing tool, but that the program is prohibitively expensive. This fear derives from several incomplete and potentially misleading studies carried out internally over the past two decades (Shavit, 1988 and Brody, 1984). Accordingly, a comprehensive, in-depth study of the expenditure implications of the IP program could have a major impact on KHC policy.

Theory alone does not lead to clear conclusions about the relationship between cost and practice mode. On the one hand, IPs have an incentive to maximize their practice sizes. By frequently referring patients to specialists and hospitals instead of inviting them back for return visits, an IP can maintain a large practice without having to work too many hours. (Glaser, 1970; Reinhardt, 1985; Wilensky and Rossiter, 1986) On the other hand, IPs have an incentive to keep their patients satisfied and one way to do so is to try to minimize the amount of run around - including both visits to the clinic and visits to specialists. In addition, IP patients may use nursing and pharmacy services less than their clinic counterparts because of the inconvenience involved in having to travel from the IP's office to the clinic.

On the international scene, many health care professionals see clinic care as having important cost and quality advantages over traditional solo fee-for-service practice (Kohn, 1983). Proponents of clinic care note that HMOs in the USA have achieved hospital utilization rates substantially below those prevailing in the American health system in general (Enthoven, 1980; Luft, 1981; Manning 1984). However, it remains unclear whether the critical factor is the element of group practice, the prepayment feature of HMOs or various selection biases. It is also worth noting that recently several individual practitioner associations (IPAs) have succeeded in lowering hospital utilization rates, thereby matching the accomplishment of the staff model HMOs (Welch, 1987).

Compared with KHC members, members of the smaller sick funds tended to use out-of-plan/private PCPs (primary care practitioners) less often, tend to visit their sick fund PCP less often, and tend to make less use of hospitals and other high cost services (Ben-Sira, 1987; Shuval, 1988; Rosen, 1989). As clinic care predominates at KHC, while the smaller funds rely primarily on IPs for the provision of primary care, these findings support the hypothesis that IP care reduces emergency room utilization, hospitalizations, and private physician consults. However, none of the studies reviewed controlled for differences among the sick funds with regard to patient characteristics (age, education, etc.), physician characteristics (age, country of origin, training, etc.), and sick fund policies (such as whether patients have direct access to specialists).

The studies conducted within KHC on the issue of the relative cost of the IP and clinic options concentrated on the differences in primary care costs and found that IP care is notably more expensive than clinic care. However, these studies are potentially misleading since community-based services (predominantly primary care services) within KHC account for only 25% of total direct service outlays per member, while hospitalization, hospital-based outpatient services (predominantly specialty clinics), pharmaceuticals and miscellaneous purchased services account respectively for 45%, 15%, 10%, and 5% (Figure 2). As Porter (1981) and Johnson (1985) have shown, the organization of primary care can have a major impact on such major cost items as hospital utilization. A 1975 KHC study did collect information on the rates at which IPs referred patients to more specialized and costly services. However, the only comparisons with referral rates for clinic physicians which were presented in the paper used 1965 data for the clinic physicians. In addition, no attempt was made to control for differences in patient and physician characteristics (Shavit, et. al., 1979).

The international literature on health services utilization suggests that utilization rates can be affected by decisions made by both patients and physicians. Anderson (1968) posits that patients' health seeking behavior can be influenced by need factors, enabling factors (such as income, insurance, supply of medical personnel and facilities, etc.), and predisposing factors (age, social class, race, etc.). In a review of the recent literature, Hulka and Wheat (1985) expand on this and consider five

factors: health status and need, patient demographic characteristics, physician availability, organizational characteristics of health services, and financing mechanisms. They note that the single most important factor influencing utilization is health status. They cite Wolinsky (1978) as finding that health status factors tend to account for about 2/3 of explained variation in utilization studies. Hershey, et. al. (1975) are cited as stressing the need to select those health status measures most relevant to the outcome variable being studied.

Eisenberg (1985) has reviewed the international literature on factors influencing physician practice patterns. He notes three broad categories of motives influencing physician behavior: personal interest and needs, patient good and social good. Several factors influence the prescription of services when the physician seeks to satisfy personal desires: desire for income, desire for a style of practice, the physician's personal characteristics, the practice setting and standards established by the clinical leadership. For the purposes of our study, it is important to note that many of these factors, as well as the physician's skill/knowledge level can be influenced by where - and in what - the physician was trained.

Linder-Pelz and Maier-Feintooch (1980) have reviewed the Israeli literature on patient-related variables associated with health services utilization. Consistent relationships were found between primary care utilization and variables related to age, sex, and the existence of a mental or emotional problem. The evidence linking primary care visits with income levels, education and ethnicity was less clear-cut and in some cases contradictory. With regard to hospitalization, consistent relationships were found between utilization and age, new immigrant status, and various socioeconomic indicators (income, education, etc.). Here too, the relation between ethnicity (Sephardic v. Ashkenazic) and utilization was not clear cut. Among the elderly, they found that persons living alone tended to be hospitalized more often.

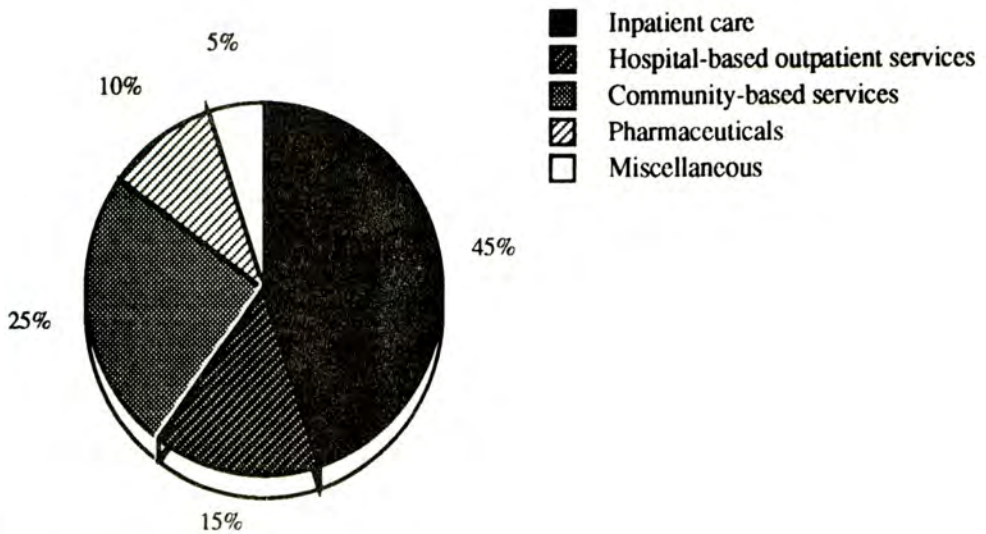
In analyzing the relationship between practice setting (IP vs. clinic) and cost within KHC, we need not worry about some of the utilization-related variables which are discussed in the literature and which have led to difficulties in interpreting inter-sick fund comparisons in Israel (Rosen, 1989). Since both IP patients and clinic patients are KHC members they are governed by similar rules regarding co-

payments and the need for referrals to use specialized services. Also, as our study will compare IP patients and clinic patients from the same region - Rishon Lezion - who receive care from the same set of hospitals, differences in bed availability and similar supply factors are unlikely to serve as confounders.

Nonetheless, there are several potential confounding variables which must be considered. Several key informants argue that IPs are more likely than their clinic counterparts to be young, service-oriented physicians who have completed family practice residency programs. It is possible that physicians with superior, more up-to-date training are in a better position to reduce hospitalizations[1].

Figure 2

Approximate Distribution of KHC Operating Costs



Source: KHC budget division

Informants also contend that IP patients are more likely than their clinic counterparts to be young, upwardly mobile, and healthy. Clearly, at least some of these patient demographic factors could lead to lower utilization rates for IP patients. As our principal objective is to help KHC management decide whether to expand (or contract) the IP option, we need to be able to assess whether utilization rates - for the same patient, cared for by the same doctor - are likely to be higher in

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[1]It is also possible that younger primary care physicians will tend to hospitalize patients more often, if they are risk-averse and concerned about their own lack of experience.

the clinic setting or the IP setting. Thus, the potential confounders must be controlled for in the experimental design and/or at the analysis stage. In the discussion section we will review the extent to which the necessary variables have been included in the analysis.

3 METHODOLOGY

In 1988, Kupat Holim Clalit spent approximately $370 per person on health services for its members. Headquarters overhead accounted for 15% of total outlays, while direct service accounted for 85% of total outlays. The cost comparisons in this research project have focused on *the four largest components of direct service expenditures*. Inpatient care was KHC's single largest cost component, accounting for roughly 45% of total direct service outlays. The three other major components of direct service outlays were community services (25% - primarily primary care clinics, but also community-based laboratories, specialists, and x-rays), hospital - based outpatient services (15%), and pharmaceuticals (10%). Miscellaneous purchased services accounted for 5% of direct service expenditures. Note that 'hospital-based outpatient services" includes both specialty outpatient clinics and emergency room services,[1] with the former significantly larger than the latter.

Due to time and budgetary limitations, the decision was made to limit the analysis to one Kupat Holim Clalit administrative region. The Rishon Lezion region was chosen in part because of the interest of regional management in the project and in part because the region has a sizeable IP program. In addition, for reasons discussed below, computerized data on hospital outpatient utilization was more readily available in Rishon Lezion than in most other regions.

Like other KHC regions, Rishon Lezion has its idiosyncrasies. Nonetheless, the region is in many ways typical of KHC regions which have sizeable IP programs. In the absence of a national study, the Rishon Lezion study can be used to guide KHC policy, as long as policymakers are careful to make formal or informal adjustments for factors unique to that region.

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[1]Reliable data on ER usage were not available at the patient-level and as a result it was not possible to carry out a separate analysis of ER costs.

The study design has taken advantage of the fact that many KHC independent physicians spend part of their time working as salaried physicians in KHC clinics. This has permitted us to identify four groups of KHC members:

1. Members who receive care in an IP's private office from a physician who works only as an IP within the region (henceforth "IP-ONLY")

2. Members who receive care in an IPs' private office from a physician who also works in the clinics within the region (henceforth "IP-DUAL")

3. Members who receive care in KHC clinics from physicians who also work as IPs within the region (henceforth "CL-DUAL")

4. Members who receive care in KHC clinics from physicians who work only in the clinics within the region (henceforth "CL-ONLY").

Table 1 presents data on the number of patients in each of the four groups and Table 2 presents data on the number of physicians in each group. In the discussion that follows, the term "patient group" will be used to refer to the four groups described above. The terms "site of care" and "practice setting" will be used interchangeably to refer to the IP-clinic dichotomy.

By comparing group 1 with group 2 (or group 3 with group 4) we can study utilization differences which emerge within a given practice setting. The two groups differ with regard to the patients and physicians involved and these differences may well find expression in the raw data on utilization. In our regression analysis we will be able to see what happens to the differences in utilization between these two groups when we control for certain differences in patient and physician characteristics.

When we compare the utilization patterns for group 2 and group 3 we can study the differences which emerge when the same group of physicians work in the two different practice settings. Note, however, that it will still be important to include information not only on patient characteristics, but also on physician characteristics in the analysis stage; the experimental design does not suffice to control for physician characteristics. This is because, while groups 2 and 3 are

comprised of the same 25 physicians, any particular physician may account for a large share of the patients in one group and a small share of the patients in the other group.

In presenting the findings in the course of this paper, it will not prove efficient to make all six pair-wise comparisons among the four groups for each variable of interest. For purposes of clarity, we will use the CL-ONLY group as the reference group; it was chosen because it is largest in size. In addition, attention will be drawn to differences between the IP-DUAL and CL-DUAL groups as our main interest is in the difference between the IP and clinic setting and that particular comparison has the advantage of controlling, somewhat, for physician characteristics. As noted above, for other purposes, a different pair-wise comparison may be more salient.

Table 1

The Four Groups in Rishon Lezion: Number of Members by Site of Care and Number of Sites in which Physician Works

Site of Care	Single Site MDs	Two Site MDs	Total
Clinic	129,911	33,648	163,559
Private Office	14,306	8,553	22,859
Total	144,217	42,201	186,418

Table 2

The Four Groups in Rishon Lezion: Number of Physicians by Site of Care and Number of Sites in which Physician Works

Site of Care	Single Site MD	Two Site MDs	Total	Percent in Two Sites
Clinic	88	25	113	22%
IP	30	25	55	45%
Total	118	25	143	

As suggested by a comparison of Tables 1 and 2, practice sizes vary markedly between the clinic and IP setting. The 55 physicians in the IP setting have an

average list size of 416 KHC patients (in the IP setting). Ten physicians have lists with more than 650 patients and the IP with the largest list has 1,774 patients. Ten physicians have fewer than 100 patients on their lists. Generally speaking, the IP patients are distributed widely over a large number of physicians, most of whom have between 200-700 KHC patients. Note that many of them also see patients from competing sick funds on a capitation basis and/or private patients on a fee-for-service basis.

The 113 clinic physicians have an average list size of 1,447 (in the clinic setting). One physician has 2,515 patients and 10 physicians have 1,775 or more patients. No physician has fewer than 100 patients and only 15 physicians have 1,000 patients or less. As in the IP setting, patients are not concentrated among a small number of physicians.

Data sources

The analysis is based primarily on computerized administrative records maintained by KHC's central office. A total of eight different data sets have been used and linked, as follows:

Patient demographic data

Kupat Holim Clalit maintains a computerized membership file which contains information on the age, sex, health status, and residence of members. For the analysis of hospital utilization (inpatient and outpatient) the membership file for Rishon Lezion was divided into the four patient groups identified above. The sampling procedure was complicated by the fact that the KHC information systems retain the records of past members, even if the membership is no longer active due to death, enlistment in the army or failure to pay dues. Accordingly, prior to sampling we excluded persons who had been inactive for the entire period from April,1987 to April, 1989 We then chose random samples from each of the four groups, with the sampling proportions chosen so that the sample would include 3,800 members for each group. Next, in the case of both the inpatient and outpatient analyses, a small proportion of this sample was excluded as being "inappropriate". In the case of the analysis of inpatient utilization (where the utilization data were

for 1987) we excluded persons born in 1988 and 1989, while in the analysis of April-May 1989 outpatient utilization we excluded persons who were no longer active members at that date.

The pharmaceutical study is based on the entire active membership of the Goldrosen clinic as of July, 1989. The reasons for restricting the pharmaceutical study to a single clinic will be discussed below.

MD characteristics

KHC maintains a computerized manpower file for all physicians and other personnel employed in the clinics. The file contains information on age, country of birth, specialty, etc. The information in this file was supplemented with comparable data on the independent physicians secured via a mail questionnaire with telephone follow-up. Strong backing of the study by KHC's management resulted in a 100% response rate. Information on practice size for each physician in the region was derived from printouts from the membership file. Data from the membership file and the completed physician file were linked using unique physician identifiers - their license numbers and their ID numbers (see Figure 3).

Inpatient utilization

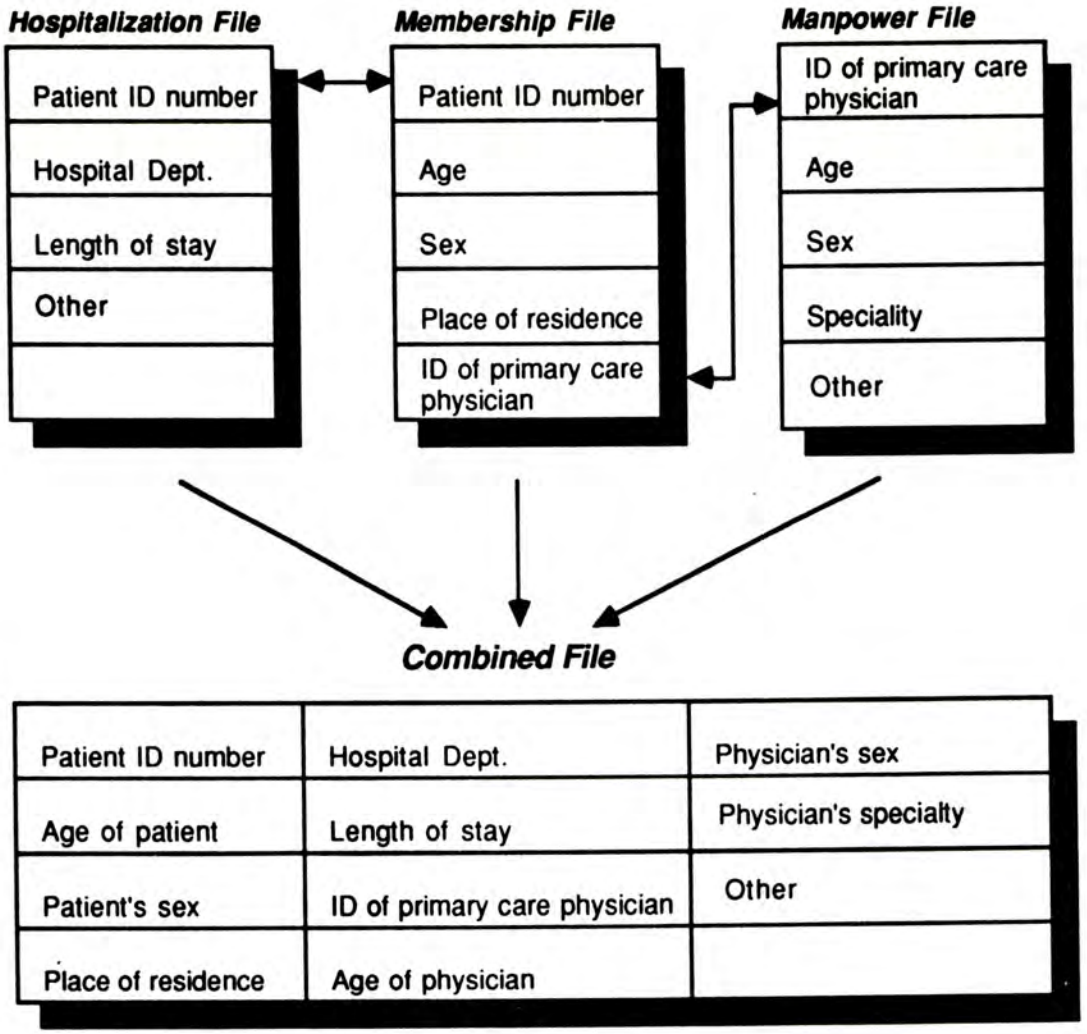
KHC maintains a computerized file of all hospitalizations of sick fund members which were paid for by KHC, irrespective of whether the hospitalization took place at a hospital operated by KHC or at some other Israeli hospital. The hospitalization file is not updated continuously. The most recently available year, 1987,was used in the analysis. A file containing all of the calendar year 1987 hospitalizations for Rishon Lezion members of KHC was linked with the membership file using the patients' ID numbers.

Israeli hospitals do not generate itemized bills for individual patients; only the number of days and the department are recorded. Department-specific per-diem cost weights were derived from a detailed departmental cost analysis carried out in the B'nai Zion Medical Center, Haifa in 1988. These cost weights need to be used cautiously as relative costs of the various departments in B'nai Zion may not be

representative of Israeli hospitals as a whole and because cost weights for departments which do not exist at B'nai Zion had to be extrapolated.

Figure 3

Combining Hospitalization, Membership, and Manpower Data to Analyze Inpatient Costs



Outpatient data

KHC does not maintain a computerized file of outpatient usage analogous to its inpatient file. In addition, the utilization of KHC hospital outpatient departments by KHC members is not routinely recorded, understandable in light of the fact that

KHC does not have to pay for these services on a fee-for service basis. On the other hand, the government hospitals do maintain a computerized information system on outpatient specialty clinic utilization, containing information on both the number of visits and the amount billed per visit. Rates for outpatient services in all governmental and non-profit hospitals in Israel are determined by a fee schedule established by the Ministry of Health. The fee schedule was first established in the early 1980s based on a rough analysis of the relative costs of various outpatient services. The entire schedule is revised upwards periodically to reflect inflation. The relative prices of particular items - usually big ticket items - are reviewed sporadically, usually in response to complaints from buyers or sellers.

Reliable data on ER usage were not available at the patient-level and as a result it was not possible to carry out a separate analysis of ER costs. Our analysis assumes that differences in ER costs between the four patient groups parallel the differences in hospital-based outpatient specialty clinic costs.

Data on outpatient specialty clinic utilization by KHC members for the months of March and April 1989 were obtained from Asaf Harofeh, the government hospital in the region which serves officially as Rishon Lezion's regional hospital and which accounts for roughly 3/4 of hospital admissions of Rishon Lezion KHC patients. If IP patients and clinic patients were to go out of the region to varying degrees for their OPD care, reliance on these data alone would introduce a bias. We know from our analysis of the inpatient data that for our study sample, Asaf Harofeh accounts for 80% of CL-ONLY admission, 79% of CL-DUAL admissions, 71% of IP-ONLY admissions and 75% of IP-DUAL admissions. The analysis which follows assumes that these same percentages hold true for outpatient utilization and the findings from Asaf Harofeh are adjusted accordingly. The data from Asaf Harofeh were linked to the membership file using patient ID numbers.

Pharmaceutical usage

No computerized file exists on drug utilization at the patient level. Approximately 10,000 pharmacy slips (with an average of roughly two items per slip) were received by the pharmacy at the Goldrosen clinic between April 26 and May 25, 1989. This is referred to in our Tables as May, 1989. The pharmacy separates these slips into

three groups - "specially controlled drugs", "drugs dispensed on a periodic basis to chronic patients" and "all others". A 10% sample was drawn by selecting every 10th prescription from each of the three bundles for each of the 26 days that the pharmacy was in operation during the study period. The prescriptions contained the patients' names, the names of the drugs prescribed and the quantities prescribed. Patient ID numbers were found by looking up the patients in the clinic register. The ID numbers were then used to link the pharmacy data with the membership file. KHC's supply division supplied cost data for each item in the sick fund's pharmacopeia.

The initial 10% sample included 1052 prescription slips. However, the analysis is based only on the 589 slips for which there were complete data. The principal reason for "dropping" a slip was failure to identify the patient's ID number (either because several members cared for by the Goldrosen clinic had the same name, the names were illegible, or the name did not appear in the Goldrosen membership printout). In 58 cases the name was found on the hard-copy clinic register (and could therefore be assigned an ID number) but we did not succeed in finding a match for that ID number on our computer tape of Goldrosen members.

In contrast to the other elements of the cost study which use the entire membership of the Rishon Lezion region as the study population, the drug utilization analysis is based on a single service area. This was done because of the need to work with non-computerized data and because a simple random sample from a large number of clinics would have yielded a very small number of prescriptions for IP patients. Goldrosen was a logical choice for the study as it is the single largest service area in the region, accounting for 10% of total regional membership and 25% of members receiving care from IPs.

Primary care costs

The study of community-based/primary care costs proceeded in three stages. First, the financial division of KHC headquarters supplied estimates of the projected full costs of the Rishon Lezion region for 1989 by major line items. These costs were allocated between the IP patients and the clinic patients according to (a) their share in total clinic membership and (b) estimates by KHC managers and staff of the

demands of typical IP and clinic patients on various types of resources. Finally, marginal cost analyses were performed for several different scenarios (which are described in the Findings section and in Appendix D), with KHC management reviewing the division of costs into fixed and variable components for each of the scenarios.

The multivariate analysis

None of the utilization variables analyzed in this study were normally distributed. The situation for admissions is fairly typical: 94% of the members in the sample were never admitted during the study period, an additional 4% were admitted only once, 0.5% were admitted twice, and the right-hand tail is quite long with one member admitted 43 times!

Accordingly, a two-stage multivariate analysis was employed to control for the potentially confounding effects of patient and provider characteristics. First, logistic regressions were run with the dependent variables being dummies for "hospitalized at least once", "visited OPD at least once", etc. The independent variables included physician characteristics, patient characteristics, and patient group - the variable of primary interest for our study. Next, the natural log of the utilization variable (admissions, outpatient costs, pharmaceutical costs, etc.) was regressed against those same independent variables, using only those observations for which the dependent variable was non-zero. In the case of the inpatient data, variables representing the number of months of active membership and the reasons for inactivity were included in the regressions.

The analyses were carried out using the SPSS-X statistical package on a MICROVAX-II. Note that the VAX was not large enough to accommodate logistic regressions run on the entire data set. Accordingly, they were run on a data set which included:

a) All observations for which admissions (in the case of the inpatient analysis) and visits (in the case of the outpatient analysis) was equal to 1 or more.
b) A 10% random sample of all other observations.

This procedure does not bias the coefficients of the explanatory variables (McCullagh and Nelder, 1983) but it does lead to an upward bias in the estimates of expected utilization. The raw estimates were adjusted accordingly (see Appendix A for further details). The procedure can also effect the reliability of the coefficient estimates. Accordingly, the procedure was rerun five times (using independent 10% samples); the resulting coefficient estimates were extremely stable across runs.

4 FINDINGS

Patient characteristics

Table 3 summarizes data on the characteristics of IP patients and clinic patients in Rishon Lezion. The average age among IP-ONLY patients, 26.6, is markedly lower than the 30+ figures for the other three groups. The percentage of clinic patients over 60 (12.3%-13.0%) is higher than the percentage of IP patients over 60 (8.5%-9.0%). However, the differences in age composition are not as great as many persons believe. The same can be said of the difference in the percentage of members in each group registered as recipients of monthly prescriptions for the treatment of chronic conditions, a useful indicator of health status. In the clinic groups roughly 14% of the patients were so registered compared with 11% in the IP groups. [1]

The socioeconomic differences among the various groups may be more significant. For example, only 0.7% of IP-DUAL patients and only 1.3% of IP-ONLY patients are welfare recipients, while 3.2% of CL-ONLY patients and 2.7% of CL-DUAL patients fall into that category. And, while approximately half of the clinic patients in the Rishon Lezion region live in the city of Rishon Lezion, almost three-quarters of the IP patients live there. [2] This is a very gross but, nonetheless, useful measure of socioeconomic status as the city of Rishon Lezion is characterized, on average, by higher socioeconomic status than the rural settlements and the two other cities in the region (Ramle and Lod).

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[1] Most of our contacts in KHC were surprised that the difference in the prevalence of chronic illness between IP and clinic patients was not larger than the roughly 25% difference that we found.

[2] Soon-to-be-published data from a survey of KHC members in Rishon Lezion indicate that IP members are drawn disproportionately from upper income groups.

Table 3

Patient Demographic Characteristics by Patient Group - May, 1989

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Average age	31.4	31.0	26.6	30.1
		Percentages		
Over age 60	12.3	13.0	9.0	8.5
Male	48.1	48.6	49.0	47.7
"Chronic"	13.6	14.8	11.1	11.3
On welfare	3.2	2.7	1.3	0.7
Residing in Rishon	38.0	63.0	73.0	72.0
N	3,452	3,472	3,455	3,509

Physician characteristics

Table 4 provides data on physician characteristics for each of the four patient groups. Note that the data in this table do not give each physician in the region equal weight. Part A was prepared using the computer file containing the roughly 15,000 members in the sample. Each member constitutes an observation, and the relevant physician-related variables were analyzed for each member. Essentially, the physicians have been weighted by practice size. In part B, the unit of observation is the physician rather than the patient; each physician was given equal weight. Note that some data items were missing for a small percentage of the physicians in the sample, and as a result the effective sample size varied by parameter. The sample sizes (N) listed in the table are for those parameters for which there were no missing values. Note also that the findings for IP-DUAL and CL-DUAL are not identical, even though the study design dictates that each physician in the IP-DUAL group should also be included in the CL-DUAL group, and

vice versa.[1] As mentioned in the methodology section, the information from the two columns comes from different data sources - the manpower file at KHC in the case of CL-DUAL and our mail survey in the case of IP-DUAL. There may be inconsistencies and differences in the frequency of missing values between these two sources. In addition, there were apparently some minor errors in assigning physicians to the IP-DUAL and CL-DUAL groups. As a result, in the case of 2 of the 25 physicians who work in both settings, the two columns do not relate to the same physician.[2] The impact of these errors on the study's findings regarding the cost implications of the two programs is probably marginal.

Table 4

Physician Characteristics By Patient Group - May, 1989

Part A: Each Member Constitutes an Observation

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Average MD Age	48.7	49.6	44.9	48.4
		Percentages		
Over age 60	14.2	16.4	3.6	14.3
Male	41.5	52.5	86.2	55.7
Born in Israel	13.7	0.0	22.4	4.7
Trained in Israel	10.8	18.8	37.6	22.8
Trained in Family Medicine	12.2	8.7	0.0	7.8
Trained in Internal Medicine	0.2	0.0	8.4	0.0
N (members)	3,452	3,472	3,455	3,509

[1]Note that in the case of Part A, the IP-DUAL/CL-DUAL differences may be accounted for by variation in practice size.

[2]In one case, the error arose because of a mix-up between two physicians whose names are spelled similarly. In the other case, two physicians have a joint IP practice, and mistakenly the demographic data for one of the partners was entered into the IP-DUAL data file while the other partner's demographic data was entered into the CL-DUAL data file.

Part B: Each Physician Constitutes an Observation

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Average MD Age	49.0	47.5	45.6	46.5
		Percentages		
Over age 60	21.2	16.0	10.5	14.3
Male	41.2	48.0	78.3	60.9
Born in Israel In Israel	10.0	0.0	17.4	4.3
Trained in Israel In Israel	9.4	20.0	43.5	21.7
Trained in Family Medicine	11.8	8.0	0.0	13.0
Trained in Internal Medicine	0.2	0.0	8.7	0.0
N (physicians)	88	25	30	25

Part A of the Table indicates that the IP-ONLY group of physicians is markedly different from the other three groups. First, 86% are males, compared to 41-55% in the other three groups. They are also a younger group, with fewer than 4% of patients in this group receiving care from a physician over the age of 60. The IP-ONLY physicians are more likely than the others to have completed a specialty in internal medicine and less likely to have completed a family practice residency. Almost 20% are Israeli born and almost a third received their diplomas from Israeli medical schools - both figures higher than those for the other three groups. In comparison with the IP-ONLY group, physicians in the other three groups were more likely to have been trained in Russia and Eastern Europe; it is generally believed that training there is inferior to the training provided by Israeli medical schools.

Inpatient utilization

Table 5 presents raw data on patient-days and admissions per 1,000 members as well as data on average length of stay, estimated inpatient cost per member, and the percentage of members admitted at least once, for each of the four groups of interest.[1] Note that with regard to most of these indicators, utilization tends to be lower for the IP patients. At the same time, it is important to note that for both IP care and clinic care, utilization rates tend to be higher among physicians working in only one setting than for physicians working in two settings. As a result of the combined effect of these two factors, patient day rates for members in the "CL-ONLY" category are almost 50% higher than the corresponding rate for members in the "IP-DUAL" category (521 v. 364); the patient day rates for "CL-DUAL" and "IP-ONLY" are intermediate. This difference in patient days between the two extreme groups can be decomposed into differences in admission rates (106 v. 79) and differences in length of stay (4.9 v.4.6). Note that the data on estimated cost per member should be used with caution due to the methodological problems cited above.

As indicated in Table 6, not all of the persons in our study sample were active members of KHC for the entire year. The average person in the study was active approximately 11.9 months, but 8.8% of the sample was inactive for part of the year. Among the clinic patients, suspension of membership (due to non-payment of dues) was the predominant reason for lack of active membership, while in the IP only group the dominant factor was being drafted into the army. Death was a larger factor among the IP groups than among the clinic groups, and in light of the

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[1]Note that the hospital utilization rates reported here are lower than the national average data reported by the Ministry of Health. There are several reasons for this. First, KHC data do not include hospitalizations of its members not financed by the HMO. Thus, obstetric admissions (whose costs are covered by the National Insurance Institute) are excluded, as are hospitalizations done on a private, out-of-pocket basis. In addition, KHC estimates that 5-10% of admissions which it finances are missing from its computer file. It may also be that hospitalization rates in the Rishon Lezion region are lower than the national average. Finally, experience with the hospitalization file in other studies suggests that ID numbers for a small number of admissions (less than 5%) will fail to match with the membership file.

tendency for health service utilization to be high in the months immediately preceding death, it is clear that this factor must be taken into account in our multivariate analysis.

Table 5

Inpatient Utilization by Patient Group - 1987
(numbers in parentheses are standard errors)

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Patient days	521	444	377	364
(Per 1,000 members)	(.87)	(.80)	(.67)	(.70)
Admissions	106	84	84	79
(Per 1,000 members)	(.24)	(.19)	(.12)	(.13)
Implied average length of stay	4.9	5.3	4.5	4.6
Estimated cost per member *	94	83	70	68
	(.15)	(.15)	(.12)	(.13)
Percentage admitted once or more	6.4	5.5	5.8	5.5
	(0.01)	(0.01)	(0.01)	(0.01)
N	3,722	3,730	3,668	3,721

* Based on average departmental costs calculated for B'nai Zion Medical Center in 1980 in US $.

The influence of patient characteristics, physician characteristics and practice setting upon inpatient utilization were analyzed using the two-stage procedure outlined in the methodology section. The detailed regressions results can be found in Appendix A. Note that in the regression analyses an attempt is made to control for members who were not active for the entire year by including both the cause of inactivity and the number of active months as right hand variables.

Appendix A reports the regressions for admissions, patient days, and estimated inpatient costs. Here we report the results for admissions only. We considered using days, rather than admissions, as the focus of our analysis because we were interested in the closest proxy of true costs for which reliable data could be

generated. (The "estimated inpatient cost" variable was not given serious consideration because the data are not sufficiently reliable.) In the end we chose admissions rather than days as the key inpatient utilization variable because (for reasons discussed more fully in the sensitivity analysis section) the theoretical link between length of stay and practice setting is very weak.

Table 6

Membership Status By Patient Group

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Average Months Active	11.82	11.84	11.92	11.96
		Percentages		
Inactive All Year	9.3	8.8	9.4	7.8
Of These:				
Deceased	1.6	1.2	2.6	1.3
Drafted	3.6	3.1	3.9	3.8
Suspended	4.1	4.4	2.9	2.6

The regression equations included the following independent variables: the patient's group, age (3 groups), sex, residence, welfare status, health status (chronic or not chronic), activity status (active, deceased, drafted, etc.), and number of active months in 1987; and the physician's sex, age (3 groups), specialty, and country of medical school diploma.

The dummy variables with the largest positive coefficients in the logit analysis were those representing health status (chronic condition; deceased in the course of the year), age, and member residence outside the city of Rishon. The variable with the largest negative coefficient was the dummy variable representing welfare financing. Many of these patient-related coefficients were statistically different from zero in the logit regression as well as in the OLS regression. In general, the physician variables did not prove statistically significant in either the logit or the OLS regressions. The only exception was the coefficient on the dummy variable

representing graduation from an Israeli medical school. It was positive in the OLS regression and significant at the .10 level.

Table 7 summarizes the key findings from the logistic and OLS regressions involving admissions and consists of three inter-related rows of numbers. In each row, the numbers have been standardized so that the figure for CL-ONLY is 1.0; this will facilitate comparisons across groups in the paragraphs to follow. The first row summarizes the findings from the logistic regressions and contains information on the probability of being admitted at least once (i.e. once or more) in the course of the year. The second row summarizes the findings from the OLS regressions; it contains information on the average number of admissions in the course of the year **for those persons admitted at least once.** The "bottom line" can be found in the third row - the admission rate (i.e., the average number of admissions in the course of the year for each patient group as a whole).

The three rows are intimately related. To illustrate the relationship among the variables, consider the following hypothetical example:

1. In 1992, 5% of the Israeli population as a whole, is admitted to a hospital at least once in the course of year,

2. Among those 5% who will be admitted at least once, the average number of admissions will be 2.

3. The rate of admissions for the population as a whole would be .10, which is the product of 2 and .05 (5%).

Note that the figures in Table 7 are somewhat less intuitive, as they have been standardized so that a figure of 1.0 is obtained for CL-ONLY in each row. Nonetheless, here too, for each of the four patient groups, the figure for the third row is the product of the figures in the first two rows. For example, for CL-DUAL the third row figure - .90 - is the product of .94 and .96 - the figures in rows 1 and 2.

The first row of Table 7 indicates that (per the logit analysis) the likelihood of being admitted once or more, after adjusting for patient and physician characteristics,

was lowest for CL-DUAL, highest for CL-ONLY, and intermediate for the two IP groups. Thus, for example, the likelihood of being admitted once or more for CL-DUAL patients was 94% of the likelihood of being admitted once or more for CL-ONLY patients. The second line of the table summarizes the OLS regressions which were run on those patients admitted at least once. It indicates, for example, that **among patients admitted at least once**, admissions for CL-DUAL were 96% as great as for CL-ONLY patients. The third and key line of the table is the product of lines 1 and 2, and provides data on the admission rate for each group as a whole. It indicates that, in comparison with CL-ONLY, the admission rate for the CL-DUAL group is 90% as high, and the admission rates for each of the IP groups are 94% as high.

Note that the regression results for "days" were quite different than the results displayed here for "admissions". They implied that the hospital use rates for the IP patients were approximately 20% lower than the rates for clinic patients. We will return to this finding in the sensitivity analysis where we will consider the impact of using days instead of admissions as the principal indicator of inpatient utilization.

Table 7

Estimated Utilization Rate After Correcting for Confounding Variables (Inpatient Analysis)
(Standardized so that CL-ONLY = 1.00)

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Standardized probability of being admitted once or more	1.00	0.94	0.97	0.99
Standardized average number of admissions among members admitted at least once	1.00	0.96	0.97	0.95
Standardized average number of admissions among all members (admission rate)	1.00	0.90	0.94	0.94

Outpatient utilization

Table 8 presents data on outpatient utilization for two months at Asaf Harofeh Hospital only. As noted above, it will be necessary to adjust these data to reflect differences in dependence on this hospital among the four groups. The most important outpatient-related variable for our analysis is "estimated cost (i.e. charge) per member". The Table shows marked differences among the groups for this variable: from 5.3 NIS for the IP dual group to 11.7 NIS for the CL-ONLY group. As with the inpatient data, we find support here for two effects - practice mode (IP v. CLINIC) effect and an "ONLY" v. "DUAL" effect. The IP-ONLY group is highest in terms of number of visits and percent of members who visited once or more.

Table 8

Outpatient Utilization at Asaf Harofeh by Patient Group
April - May, 1989
(figures in parentheses are standard errors)

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Percentage visited once or more	4.0 (.01)	4.6 (.01)	5.0 (.01)	4.1 (.01)
Visits per 1,000 members	64 (.12)	64 (.10)	76 (.12)	58 (.10)
Estimated cost per member (NIS)*	11.7 (.07)	6.9 (.02)	7.9 (.02)	5.3 (.01)
N	3,452	3,472	3,455	3,509

* NIS = New Israeli Shekels

Table 9 summarizes the key findings from the multivariate analysis regarding outpatient charges in terms of relative use rates with the CL-ONLY group serving as the reference group. The same set of independent variables used in the inpatient analysis were used here, with the exception that the variables "activity status" and "number of months active" were dropped, as only members active in April and May of 1988 were included in the analysis. As in the inpatient analysis, the patient-

related variables proved to have higher t-statistics than the physician-related variables, particularly in the case of the logit analysis.

Details of the regression equations for both "number of visits" and "outpatient cost" can be found in Appendix B. Our analysis here focuses on the latter as it is a finer measure of resource use than "number of visits". Note, however, that the regression for visits suggests smaller differences among patient groups and in particular narrows the implied differential between the IP-DUAL group and the clinic groups. For both number of visits and costs, the OLS regressions explained only a very small proportion of total variance.

The logit analysis indicated that the likelihood of visiting the OPD at Asaf Harofeh once or more, after adjusting for patient and physician characteristics, was greatest for the IP-ONLY group. This finding is summarized in the first line of Table 9, which indicates that, for example, the likelihood of visiting the OPD once or more for IP-ONLY patients was 22% greater than the likelihood of visiting once or more for CL-ONLY patients, while the likelihood estimates for IP-DUAL and CL-DUAL are approximately equal and fall between IP-ONLY and CL-ONLY. Note the difference in the rankings of the four groups in Table 9, where we have removed the effect of various confounding variables, and Table 8, where the raw data are exhibited. In particular, the CL-ONLY group emerges as the most expensive in Table 8, while the IP-ONLY group emerges as the most expensive in Table 9.

The second line of Table 9 summarizes the OLS regressions which were run on those patients who visited the OPD at least once. It indicates, for example, that among patients who visited at least once, outpatient charges were 6% lower among IP-ONLY patients and 20% lower among IP-DUAL patients in comparison to CL-ONLY patients. The third line of the Table is the product of lines 1 and 2, and provides data on the expected OPD charges for each group divided by the expected OPD charges for the CL-ONLY group. It indicates, for example, that in comparison with the CL-ONLY group, IP-DUAL patients generated 10% lower charges at Asaf Harofeh outpatient clinics.

However, the data must be adjusted for the extent to which the different groups rely on Asaf Harofeh. As noted earlier, we assumed that the reliance on Asaf Harofeh

was the same for both inpatient and outpatient services. The share of Asaf Harofeh in total hospital admissions for each of the four groups is indicated in the line entitled "adjustment factor". The final line of the Table indicates the findings after the necessary adjustments have been made. For example, in comparison with the CL-ONLY group, expected charges were 2% higher for CL-DUAL, 29% higher for IP-ONLY, and 4% lower for IP-DUAL. Clearly, this "adjustment" results in a different picture than is implied by the raw data with regard to the IP-ONLY group. We will return to this issue in the sensitivity analysis section.

Table 9

Estimated Utilization Rates (Outpatient Analysis) after Correcting for Confounding Variables (standardized so that CL-ONLY =1)

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
ASAF HAROFEH				
Standardized probability of visiting once or more	1.00	1.14	1.22	1.12
Standardized average outpatient charges for those who visited at least once	1.00	0.89	0.94	0.80
Standardized average outpatient charges for all members - unadjusted	1.00	1.01	1.15	0.90
Percent of admissions which were to Asaf Harofeh	0.80	0.79	0.71	0.75
Adjustment factor	1.00	1.01	1.13	1.07
ALL HOSPITALS				
Standardized average outpatient charges for all members - adjusted	1.00	1.02	1.29	0.96

Pharmaceutical utilization

As noted in the Methodology section, the pharmaceutical analysis was restricted to a single service area (Goldrosen) within the Rishon Lezion region. The demographic characteristics of the four groups within the Goldrosen service area are summarized in Table 10. The picture is more or less similar to that which prevails for the region as a whole (see Table 3). However, the variation among patient groups with regard to percent "chronic" (i.e. those receiving medication on a regular, monthly basis) and percent on welfare is smaller within Goldrosen than for the region as a whole.

Table 11 presents raw data on the number of prescriptions and estimated pharmaceutical costs for each of the four groups for the 589 slips for which there were full data and matches with the membership file. To get estimates of annual usage per member-year these figures would have to multiplied by 12 (to reflect the number of months) and then again by 10 (to reflect the 10% sampling procedure) and then again by 1052/589 to correct for the "drop-out rate". However, as our interest here is in relative utilization among the four patient groups, the raw data presented in Table 11 are sufficient.

Our sample of fully coded and identified prescriptions contained at least one slip for 2.2% of members in the CL-ONLY category, 2.1% of CL-DUAL members, 2.4% of IP-ONLY members, and only 1.6% of IP-DUAL members. Note that a member can have more than one prescription slip and each slip can contain up to four drugs. As a result of these factors, the difference between the CL-DUAL and IP-DUAL categories narrows considerably when we examine the number of drugs prescribed (.039 v. .036). Finally, when drug costs are compared, the figure for IP-DUAL is actually higher than the figure for CL-DUAL and is nearly as high as for CL-ONLY. The data suggest that, in comparison with CL-DUAL members, IP-DUAL members are less likely to have one or more drugs prescribed, are likely to have approximately the same number of drugs prescribed on average, and are likely to have more expensive prescriptions on a per item basis. It is not clear whether this is due to differences in the quantities prescribed or to the specification of more expensive drugs.

Table 10

Patient Characteristics by Patient Group, Goldrosen Clinic- May, 1989.

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
AVERAGE AGE	36.4	28.4	29.2	31.8
		PERCENTAGES		
On welfare	1.3	0.7	0.7	0.8
"Chronic"	15.5	13.2	14.7	13.0
Male	48.4	48.8	47.8	49.0
Over age 65	10.2	9.7	8.8	7.3
N	12,907	6,158	4,702	1,436

Table 11

Pharmaceutical Utilization by Patient Group, Goldrosen Clinic - April, 1989

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Percentage with one or more prescriptions	2.2	2.1	2.4	1.6
number of drugs prescribed per member	0.040	0.039	0.045	0.036
Drug costs per member (NIS)*	0.34	0.27	0.32	0.33
N	12,907	6,158	4,702	1,436

*NIS = New Israeli Shekels

Appendix C reports the regressions for the number of drugs prescribed and estimated pharmaceutical costs. Here we report the results for costs only, using the same logic as was applied to hospital outpatient use. Note that the regression results for number of drugs were similar to the results for costs. Note also, that in the case of pharmaceuticals we adjusted for patient characteristics, but not for physician characteristics. The relatively small number of physicians in each category prevented an effective test of the independent effect of the various physician-related variables. In light of the limited power of these variables in explaining outpatient and inpatient utilization, this inability to include them in the pharmaceutical analysis may not be too grave a loss. This is especially true if we focus attention on the CL-DUAL vs. IP-DUAL comparison which gives us some measure of control over physician characteristics.

Table 12 summarizes the key findings regarding pharmaceutical costs in terms of standardized utilization rates, with the CL-ONLY group serving as the reference group. The logit analysis indicated that the likelihood of receiving one or more prescriptions, after adjusting for patient characteristics, varied widely across the four groups. This finding is apparent from the first line of Table 12, which indicates that, for example, the likelihood of receiving one or more prescriptions was 2% lower than for CL-DUAL patients compared with the CL-ONLY reference group, while the comparable figure for IP-DUAL was 12% lower.

Note that (analogous to the situation for the outpatient data) the relative standing of the four groups is different in Table 12, where the effect of various confounding variables have been removed, than in Table 11, where the raw data are exhibited. In particular, the IP-ONLY group emerges as relatively more expensive in Table 12.

The second line of the table summarizes the OLS regressions which were run on those patients who received one or more prescriptions. It indicates, for example, that among such patients, pharmaceutical costs for CL-DUAL were 12% lower than for the CL-ONLY reference group, whereas among IP-DUAL patients they were 23% higher. The third and key line of the table is the product of lines 1 and 2, and provides data on the expected pharmaceutical costs for each group divided by the expected costs for the CL-ONLY group. It suggests that costs for the IP-DUAL group

are approximately 8% higher than for the CL-ONLY group, after adjusting for patient demographics. Relative utilization is highest for the IP-ONLY group - 34% above the utilization level for CL-ONLY.

Table 12

Estimated Utilization Rates (Pharmaceutical Analysis) After Correcting for Patient Characteristics (Standardized So That CL-Only = 1)

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Standardized probability of having one or more prescriptions	1.00	0.98	1.10	0.88
Standardized average pharmaceutical costs among members with one or more prescriptions	1.00	0.88	1.22	1.23
Standardized average pharmaceutical costs among all members	1.00	0.86	1.34	1.08

Primary care costs

Tables 13 and 14 present the key findings regarding primary care costs; Appendix D presents supplementary data and explains the steps taken to arrive at these findings. Table 13 indicates that, on a full cost basis, primary care costs are 217 NIS/member-year in the IP-setting compared with 160 NIS in the clinic setting.

Note that the capitation paid to the IPs average 176 NIS per member annually (it is higher for children and lower for adults), or 81% of IP primary care costs. In the clinic setting, payments to primary care physicians average 62 NIS/member annually, or just 39% of total primary care costs for clinic members.

Table 13

Annual Full Primary Care Costs Per IP Member and Per Clinic Member

In April 1989 NIS

	Clinic Costs	**IP Costs**
Independent physicians	0	176
Clinic MDs	62	0
Clerks	13	9
Maintenance	9	1
Nurses	26	6
Specialists	4	4
Lab workers	3	3
Pharmacists	11	10
Paraprofessionals	3	3
Subtotal Clinic personnel	131	37
Non-personnel operating expenses	10	1
Depreciation	5	1
Financing	9	1
Maintenance	5	1
Full cost per member	160	217
Percent of members	88%	12%

Table 14 summarizes the primary care cost per member for the two programs in terms of both full cost and marginal cost. Full primary care costs for IP patients are approximately 36% more than for clinic patients. The differential is greater in terms of marginal costs, as all of the primary care costs involved in the IP arrangement are variable (with respect to changes in the number of patients enrolled), while the clinic model entails substantial fixed costs (i.e., there are many components whose costs do not change as the number of patients cared for increases or decreases). The additional primary care costs involved in shifting 10% of clinic patients to the IP model depends substantially on how the shift is managed.

If the number of clinics in operation can be reduced by 10% via consolidation[1], then total primary care costs per member increase by approximately 3%, from 167 NIS annually to 172 NIS annually. In this case there is no increase in the per member cost for clinic patients; the 3% increase overall derives from shifting approximately 10% of the patients to a method which is roughly 30% more expensive.

On the other hand, if the number of clinics is not reduced, but the number of physicians employed is reduced by 10%, then primary care costs per member rise to 178 NIS. This is the result of two effects - shifting 10% of the patients to a more expensive practice setting (in terms of primary care) and an increase in clinic costs per patient since fixed costs such as depreciation and maintenance must now be spread over 10% fewer clinic patients.

In the third scenario, fixed clinic costs are at their highest. In this scenario, no clinics are closed and the number of clinic physicians is not reduced. The 10% reduction in clinic volume is managed by reducing the list size of each clinic physician by 10%. In this case, much of the wage bill for clinic physicians becomes a fixed cost since salary and not capitation constitutes the major part of the compensation package for these physicians.[2] Per capita primary care costs rise from 160 to 173 NIS per clinic member, and from 167 to 183 NIS per member for the region overall.

It should be noted that the marginal cost analysis presented here assumes that the patients transferred to the IP setting are average clinic patients in terms of their

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[1]Here we assume that the clinic building and grounds can be sold at a price equivalent to the initial capital expenditure in real terms. Clearly, in some areas real estate rates will have risen and there will be capital gains to be realized, while in other areas real estate rates will have declined. We assume that overall these will balance out and that the clinic buildings can be recycled for non-medical purposes without a significant loss in value.

[2]Note that this calculation was carried out prior to the expansion of the role of capitation payments within the clinics. To the extent that capitation substitutes for salary, the percentage of physician labor costs in the clinics will become more variable and Scenario C will look more and more like Scenario B.

primary care resource consumption and that the IPs will be willing to take them as patients without an increase in the capitation rate. If the marginal patients are "low-users", the cost reduction in the clinics will be less than implied in the above figures. If the marginal patients are concentrated in "high use" categories (such as the elderly), the IPs may be unwilling to accept them without additional compensation. Accordingly, the figures cited above for the marginal cost of transferring patients to the IP setting should be viewed as lower-end estimates.

Table 14

Primary Care Cost Analysis: Base Case (Full Costs) and Three Scenarios (Marginal Costs)
(In each scenario, it is assumed that 10% of clinic patients switch to IPs)
In April 1989 Shekels

	Full Costs	**10% Reduction via Con-solidation**	**10% Reduction in MDs Employed**	**10% Reduction in Lists of Clinic MDs**
Per clinic member	160	160	167	173
Per IP member	217	218	218	218
Per member - all	167	172	178	183
Total primary care cost	31,116	32,120	32,805	33,715

Synthesis of findings

Tables 15 through 20 synthesize the findings presented above. Tables 15 and 16 are based on the raw utilization figures, while the remaining Tables are for the findings after adjustments have been made for patient and provider characteristics.

In Table 15 we see that the (raw) utilization rates for the two IP groups are lower than for the CL-ONLY group in all expense categories other than primary care. Table 16 shows the unadjusted full costs for the four groups. If the two clinic groups are combined, weighting by their respective sizes, the result is an average cost of $372 per member. The comparable figure for the IP groups is $357 per member.

Thus, if one does not adjust for patient and provider characteristics, the data suggest that the higher primary care costs in the IP setting are offset by lower expenditures in other areas.

Table 15

Estimated Cost Ratios before Correcting for Confounding Variables
(Based on raw data)

	CL-ONLY	CL-DUAL	IP ONLY	IP DUAL
Inpatient	1.00	0.79	0.79	0.75
Primary care	1.00	1.00	1.36	1.36
Drugs	1.00	0.79	0.94	0.97
Outpatient adjusted	1.00	0.60	0.76	0.48

Table 16

Summary of Full Cost Per Member By Patient Group
(Based on raw data, in U.S. $)

	ALL GROUPS	CL-ONLY	CL-DUAL	IP ONLY	IP DUAL
Total cost	370	384	324	364	344
Overhead	56	56	56	56	56
Operating cost	315	329	269	309	289
Inpatient	142	151	120	120	114
Outpatient	47	53	32	40	26
Drugs	31	33	26	31	32
Primary care	79	75	75	102	102
Purchased services	16	16	16	16	16

Table 17 displays the utilization ratios from the multivariate analysis. Table 18, based on these corrected ratios, indicates that in terms of full costs, the IP program

is more expensive than the clinic program. Weighting the two clinic groups by their respective sizes (69.7% for CL-ONLY and 18.1% for CL-DUAL) results in an average cost of $366, while doing so for the two IP groups (7.7% for IP-ONLY and 4.6% for IP-DUAL) results in an average cost of $401. Using these weights, the IP program is somewhat more expensive than the clinic program with regard to hospital-based outpatient services ($53 v. $46) and pharmaceuticals ($38 v. $31). This is partially offset by lower IP costs in the inpatient area - $137 v. $142.

Total cost among patients cared for by physicians working in both settings is $386 in the IP setting and $351 in the clinic setting. Primary care costs are markedly higher in the IP setting, but this effect is diluted somewhat by the fact that expenditure levels in other areas -particularly inpatient services - are roughly equal.

Table 17

Estimated Cost Ratios After Correcting For Confounding Variables

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Inpatient	1.00	0.90	0.94	0.94
Primary care	1.00	1.00	1.36	1.36
Drugs	1.00	0.86	1.34	1.08
Outpatient adjusted	1.00	1.02	1.29	0.96

In general, physicians who work in one setting only are associated with higher costs than physicians who work in both settings. The difference is particularly marked in the IP setting where total costs are $411 for IP-ONLY compared with $386 for IP-DUAL. The differences in outpatient costs and pharmaceutical costs are the critical factors in explaining the overall difference between the two IP groups.

Table 19 summarizes the implications of the analysis for total marginal costs for the three scenarios identified above. Pharmaceutical and hospital expenditures have been treated as 100% variable. Here, too, we can see that the effect of the difference between IP and clinic groups in primary care costs has been moderated by the much smaller differences in costs in other areas. Even under Scenario C total

costs increase by only 2% (from 370 to 378) for the region as a whole. Recall that if attention is focused solely on primary care costs Scenario C is associated with a cost increase of almost 10%!

Table 18

Summary of Full Cost Per Member by Patient Group
(Based on multivariate analysis, in U.S. $)

	ALL GROUPS	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Total cost	370	369	351	411	386
Overhead	56	56	56	56	56
Operating cost	315	314	296	355	330
Inpatient	142	145	131	137	137
Outpatient	47	46	47	59	44
Drugs	31	32	27	42	32
Primary care	79	75	75	102	102
Purchased Services	16	16	16	16	16
Members	186,412	129,911	33,648	14,300	8,553
% Members	100.0	69.7	18.1	7.7	4.6

Table 19

Summary of Cost Per Member by Patient Group
Base Case and Three Scenarios (in U.S. $)

	ALL GROUPS	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Base case	370	369	351	411	387
Scenario A Clinic closures	373	369	351	411	387
Scenario B Fewer clinic MDs	376	372	354	411	387
Scenario C Smaller lists	378	375	357	411	387
# of members (in base case)	186,412	129,911	33,648	14,300	8,553
% of members (in base case)	100.0	69.7	8.1	7.7	4.6
# of members (in scenarios)	186,412	116,920	30,283	24,535	14,674
% of members (in scenarios)	100.0%	62.7%	16.2%	13.2%	7.9%

Sensitivity analysis

The analysis presented above embodied a number of assumptions which could be questioned. In addition, it employed "best estimates" for a number of parameters even in cases where the confidence intervals for those estimates were quite wide. In this section we explore the sensitivity of our findings to some of those assumptions and to the instability of some of our point estimates.

We tested the sensitivity of the findings to the following three changes in our assumptions:

1. That the findings of the pharmaceutical analysis, incomplete as it is, should be used instead of assuming that pharmaceutical use is equivalent among the four groups.

2. That the extent of reliance on Asaf Harofeh as a source of outpatient specialty care is not equivalent among the four patient groups, but instead parallels the extent to which each group relies on Asaf Harofeh for inpatient care.

3. That it is more appropriate to use "hospitalization days" than "admissions" as the key measure of inpatient utilization and expenditures

In addition, in a fourth scenario we explored the impact of reducing the capitation rate paid to IPs by 44% (enough to eliminate the IP-clinic primary care cost differential in terms of full cost). This would constitute a change in KHC policy and not a change in the assumptions underlying this analysis of the current situation within Kupat Holim Clalit.

The findings are summarized in Table 20. The Table presents the impact on full cost by patient group, for a variety of assumptions. The base case, presented above, constitutes the first row of numbers in the Table.

Table 20

Sensitivity Analysis (in U.S. $)

	ALL GROUPS	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Base case	370	369	351	411	386
Scenario 1: RX identical	370	369	356	401	386
Scenario 2: No outpatient adjustment	370	370	351	405	385
Scenario 3: Days instead of admissions	370	372	357	389	364
Scenario 4: 44% lower IP capitation	367	370	351	384	361

Scenario 1: RX Identical

The reliability of the analysis for the pharmaceutical data is weaker than the analysis for the three major cost components. Not only are the data from a one month period only, but they are from a single clinic. We analyzed data from a sample of the pharmacy slips, while for the inpatient and hospital OPD analyses we utilized data on all care episodes during the study period for persons in our membership sample. Most problematic of all, we were able to successfully code and match only about half of the pharmacy slips in our original sample and the "dropout rate" may well be different among the four patient groups.

Accordingly, one needs to consider the impact of simply throwing out the findings of this component of the study. As indicated in the second row of Table 20, doing so would reduce total costs by $10 for the IP-ONLY group, and increase total costs by $5 for CL-DUAL. For the IP-ONLY group, the impact on estimated pharmaceutical expenses is quite significant in percentage terms. However, the impact on total costs is quite limited as pharmaceuticals account for only a small part of total expenditures.

Scenario 2: No Outpatient Adjustment

The hospital outpatient analysis is far less problematic than the pharmaceutical analysis. Nonetheless, it does contain one critical assumption whose impact must be explored - the notion that while Asaf Harofeh accounts for some 80% of outpatient care provided to the CL-ONLY group, it accounts for between 71% and 79% of outpatient care for the other three groups. As indicated on the third line of Table 20, if Asaf Harofeh in fact accounts for the same portion of outpatient care for all of the four groups, then our base case slightly overestimates total cost for the two IP groups. As in the case of pharmaceuticals, outpatient costs constitute a small fraction of total costs and as a result only major changes in the estimates for outpatient expenditures can have a major impact on the overall findings. Here, too, the biggest change is for the IP-ONLY group.

Scenario 3: Days Instead of Admissions

We next tested the impact of using days rather than admissions as the principal measure of inpatient utilization. Days are probably a better proxy for costs than admissions. At the same time, the question arises as to whether it is fair, in the Israeli context, to "charge" the primary care physician with responsibility for patient-days, as opposed to admissions. In Israel, primary care physicians do not follow their patients in the hospital and hence do not have a direct influence on length of stay. The PCP could nonetheless have a major impact on length of stay because (a) he has influenced the patient's underlying health condition and thereby the need for recuperative days and (b) the hospital physician's readiness to discharge a patient will be influenced by his acquaintance with, and assessment of, the patient's PCP.

If patient days are used instead of admissions, Table 21 would have to be substituted for Table 7 in our analysis. Expected days in the IP setting are more than 20% lower than for the CL-ONLY group.

Table 21

Estimated Utilization Rates (Inpatient Analysis Using Days as the Key Variable) After Correcting for Confounding Variables (Standardized So That CL-Only = 1)

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Standardized probability of being admitted once or more	1.00	0.94	0.97	0.99
Standardized average number of days among members admitted at least once	1.00	0.99	0.80	0.78
Standardized average number of days among all members (use rate)	1.00	0.93	0.78	0.77

As indicated in Table 20, the effect here is quite dramatic. The resulting picture is that total costs for IP-DUAL ($364) are lower than for CL-ONLY ($372) and close to total costs for CL-DUAL ($357). Costs remain highest for the IP-ONLY group ($389).

Scenario 4: Lowering the IP Rate by 44%

As noted in our organizational analysis, the capitation rate paid to IPs is currently so high that an IP with an efficient practice size[1] enjoys a net income more than three times as high as his counterpart in the clinic with the same practice size. It is true that the IP is expected to provide certain administrative and nursing services which, in the clinic setting, are provided by non-medical personnel. As a result, the IP may have to put in more time per patient than the clinic physician. Nonetheless, the differential is sufficiently great that it deserves serious attention on the part of KHC management.

Accordingly, we explored the impact upon our findings of possible reductions in the capitation rate paid to the independent physicians. As the payment to the IP constitutes 82% of the full cost of providing primary care to IP members, both the primary care cost differentials and the total cost differential would change markedly in response to a lowering of the capitation rate. For example, a 44% reduction in the IP capitation rate would eliminate the IP-clinic primary care cost differential in terms of full cost, and - under Scenario A - would mean that transferring patients from the clinics to the IP program would not entail additional primary care expenditures. In terms of total cost, the IP program would still be more expensive, due to the high costs in the outpatient and pharmaceutical areas for the IP-ONLY group. A reduction of this magnitude in the IP rate would also eliminate four-fifths of the difference in <u>total cost</u> between IP-DUAL and CL-DUAL ($351 v. $361 instead of $351 v. $386). Note, however, that under Scenario C, where many clinic costs are fixed, a 60% reduction in the capitation rate would be needed to ensure that a shift of patients from the clinics to the IP setting did not increase primary care costs.

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[1]Many IPs treat patients from other sick funds and private patients as well as KHC IP patients. The efficiency of a practice will depend on the total practice size and not just the number of patients who are IP members.

This implies that those persons advocating the IP program in order to improve KHC competitiveness should consider reducing the capitation rate somewhat. A lower capitation rate would reduce KHC costs, ease an ethically problematic situation, and significantly improve the program's salability to the financial management team in KHC.

A caveat is in order here. The willingness of physicians to participate in the IP program is due, in part, to the financial gains involved. Reducing the rate significantly could make it more difficult to attract and retain high-quality physicians in the program. The program might also risk losing those physicians who are most efficient, in terms of not generating unnecessary hospitalizations. However, the current rate creates the basis for such lucrative practices that moderate reductions probably would not result in a dearth of qualified physicians willing to fill the available slots.

It may be that IPs think in terms of an hourly "target income" when deciding how much of their time to allocate to the IP program. If this is the case, then reducing the capitation rate for IPs could induce independent physicians to spend less time with each patient over the course of any given quarter.[1] This, in turn, could result in

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[1]Full-time clinic physicians are expected to see patients for 30 hours per week. An average patient load of 1,500 patients implies 50 patients registered per every hour of office time. The average IP in our study reported having approximately 20 hours of office time per week and roughly 400 registered KHC patients. Unfortunately, we do not have data on the number of patients from other sick funds registered with them or the share of their time which goes to caring for "private pay" patients. On the assumption that one half of their office time goes to KHC patients, the IPs would be caring for only 40 registered KHC patients per hour of office time - a rate 20% lower than for clinic physicians. Accordingly, it is widely believed that IPs spend more time in each visit than clinic physicians. There could be several possible explanations for this phenomenon, including:

• IPs provide "better care" than the assembly-line medicine available in the clinic by providing fewer, longer visits. According to this explanation, the IP does not spend more time than the clinic physician with each patient over the course of a year. He simply uses the time differently - fewer visits, but longer visits.

higher outlays on hospitalizations, pharmaceuticals and outpatient specialty care. With less time to spend with each patient, IPs might hospitalize, refer to specialists, or prescribe medications more often. In addition, if they have less access to their primary care physician, patients might be more likely to take the initiative in seeking additional sources of care.

If a decision is made to reduce the amount of money paid to independent physicians per capita, one way to do so would be to adopt the physician payment system which prevails in some of the smaller sick funds. Currently in KHC, the independent physician gets the quarterly capitation fee whether or not the patient visits him during the quarter; this is referred to as "simple capitation". In some of the smaller sick funds, the payment is made only if the patient visits in the course of the quarter; this system is called "active capitation". This means that if KHC were to switch from simple to active capitation the effective per capita payment would decrease; the magnitude of the decrease would depend on the percentage of members who visit at least once each quarter. Of course, any decision about whether to switch to the active capitation method would have to take into account the impact of such a change on physcians' willingness to participate in the program, consumer satisfaction, hospital and specialist utilization rates, and the administrative demands on the sick fund, in addition to the impact on primary care costs.

Profit and loss analysis

In deciding whether to expand the IP program, KHC managers must determine whether, and to what extent, the additional costs involved would be offset by additional revenues. A full analysis must take into account the following factors:

• The higher pay received by independent physicians allows them to take on fewer patients in relation to the number of hours worked per week and to dedicate more time to each patient.
• The members who sign up with IPs tend to be younger and healthier, and therefore tend to visit the physician less frequently - leaving more time for each visit.
In all of these cases, a reduction in the rate could lead the physician to spend less time with each patient.

1. The extent to which the expansion of the IP program reduces the rate at which KHC members switch to other sick funds.

2. The income and family size distributions of the new participants in the IP program.[1]

3. The propensity to use health services among the new participants in the IP program.

A detailed account of the assumptions used in our profit and loss analysis can be found in Appendix F. Here, we briefly outline the key assumptions and summarize the findings.

The first factor listed above is particularly important. If the IP program expands, two categories of persons will sign-on. The first category, which we refer to as "shoppers", consists of people who would switch to KHC from a competing sick fund in order to enrol in the IP program and current KHC members who would leave KHC if the IP option is not made available to them. The second category, which we refer to as "loyalists", consists of current KHC members who would continue to get care in KHC clinics in the absence of the IP option. Obviously, KHC has a financial interest in targeting the program at the "shoppers", as only in the case of the shoppers is KHC at risk of losing revenues. In reality, KHC is unlikely, and probably unwilling, to prevent all "loyalists" from participating in the IP program. For ease of presentation, our analysis considers two extreme cases. In the first case all the new participants are "shoppers" while in the second case they are all "loyalists".

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[1] As can be seen in Appendix F, assumptions regarding income, family size and the propensity to use health services are particularly relevant in the case of persons who would switch to KHC from a competing sick fund in order to participate in the IP program and current KHC members who would leave KHC if the IP program is not expanded. In the case of these persons, the assumptions are needed in order to calculate projected changes in KHC revenues and costs. In the case of persons who would remain with KHC (in the clinics) even if the IP program is not expanded, KHC revenues and costs will not be influenced by the decision whether or not to expand the IP program.

The IP program's profitability similarly depends on the income levels of the new participants, as KHC premiums (and the employer tax) are tied to income. Our analysis considers two cases: in the first case the new participants are upper-income while in the second case they are middle-income. With regard to the third issue, the analysis is based on the assumption that health service utilization rates for the new participants in the IP program (irrespective of whether they are upper-income or middle income) will be the same as those for current participants.

Table 22 summarizes the impact on cost, revenue and profits of adding 16,000 new participants to the IP program under conditions which prevailed in 1989 (i.e., before the employer tax law was amended in 1991). The 16,000 figure represents 10% of the current clinic population in Rishon Lezion and was chosen for ease of calculation. The first two lines of the Table indicate that expansion would be unprofitable if it entails merely shifting people who would otherwise remain in the clinics ("loyalists") to the IP program. On the other hand, if the expansion involves persons who would otherwise leave KHC ("shoppers"), it would be profitable.

Indeed, if the new participants are upper-income persons who would otherwise leave KHC, then expansion is extremely profitable. However, such a situation is extremely unlikely, as relatively few persons in Israel are "upper income" (defined in our analysis as persons with earnings in excess of four times the national average). Moreover, it is unlikely that KHC could limit the program exclusively to the highest income groups, even if it wanted to. This admittedly extreme scenario is presented to underscore the sensitivity of the calculations to the income levels of the new participants in the IP program. As described in greater detail in the Appendix, recent changes in the employer tax law have reduced the impact of income level on the profitability of the program, but have not eliminated this effect.

Perhaps the key finding is to be found in the line labelled "mid-income shoppers". If the growth is fueled by persons who would otherwise leave KHC, then expansion is profitable, even if the group of new participants consists entirely of middle income persons. A break-even analysis indicated that if the new participants are all "shoppers", then KHC would break-even even if their average income was <u>10% below</u> the national average.

Table 22

The Impact of IP Program Growth On KHC Revenues And Costs

(16,000 New Participants, Millions of $ US / Year)

	REVENUE	COST	PROFIT
Mid-income loyalists	0.0	1.0	-1.0
Upper-income loyalists	0.0	1.0	-1.0
Mid-income shoppers	5.3	4.8	+0.5
Upper-income shoppers	19.6	4.8	+14.8

The overall message of Table 22 is that the profitability of expanding the IP program appears to depend critically on two factors: the extent to which new participants would otherwise leave the sick fund, and their income levels. KHC management must make its own detailed assumptions in order to forecast the profitability of expansion. In particular, KHC management must assess whether it is desirable as well as feasible to focus the IP program on upper income groups.

5 DISCUSSION

The study suggests that the higher primary care costs associated with the IP program are not offset by lower expenditures in the hospital and pharmaceutical areas. The full cost of providing health services to the average IP member is $401 - 10% higher than the $366 figure for the average clinic patient (see discussion of Table 18). If patient days had been used instead of admissions as our principal indicator of inpatient utilization, the cost differential between the two practice modes would have been much smaller; however little theoretical justification could be found for linking practice setting and length-of-stay.

In addition to comparing the average IP patient with the average clinic patient, it is also relevant to compare the IP-DUAL and CL-DUAL groups, as these two groups are served, more or less, by the same 25 physicians. The finding here is similar - IPs are roughly 10% more expensive, with IP-DUAL costing $386 and CL-DUAL costing $351. Here, too, the higher primary care costs associated with the IP program have not been offset by lower expenditures in the hospital and pharmaceutical areas. Among the clinic patients, inpatient costs were 10% lower for patients cared for by physicians who also work as IPs in comparison with patients whose physicians work only in the clinics. It may be that this is due to the provision of a more comprehensive style of care on the part of CL-DUAL physicians, and there is a perception in the field that they constitute the "better" clinic physicians. However, the difference in inpatient utilization may also be due to unobserved patient characteristics or other factors.

Significant differences in outpatient and pharmaceutical utilization were found between those IP patients whose physicians also work in primary care clinics in the regions and those IP patients whose physicians do not work in primary care clinics within the region. It may be that the IP-DUAL physicians are in a better position than the IP-ONLY physicians to select healthier, low-use patients. It may also be that treatment and referral patterns differ. The IP-ONLY group has a higher

concentration of specialists and physicians with hospital affiliations and may differ in additional ways not controlled for in the analysis. In this regard, it should be noted that 27% of the physicians in the IP-ONLY group work either in KHC specialty clinics in Rishon or in primary care clinics in regions other than Rishon Lezion, but that utilization figures for patients cared for by this subgroup of physicians were not statistically different from those of the IP-ONLY group as a whole.

It should also be noted that many of the IP-ONLY physicians work at Asaf Harofeh Hospital and there may be a tendency to prefer that hospital's outpatient clinics when referring patients for specialty consultations. Other physicians in this study may be somewhat more likely to seek out specialists at other hospitals or community-based specialists. Accordingly, our finding that patients in the IP-group are the most frequent users of hospital outpatient services may be due to the fact that our analysis was based on data from Asaf Harofeh alone.

A particularly surprising finding is that drug utilization appears to be higher in the IP-ONLY setting than in the clinic. This contrasts with our expectation that, due to the assembly line pressures in the clinics, clinic physicians would be more likely to write prescriptions simply in order to put an end to a particular visit. It may be that this effect is offset by the strong interest among IPs to please their patients (who might be dissatisfied with a physician who did not prescribe anything) in order to maximize list size. In the IP-ONLY setting this may be compounded by the tendency of physicians who are based primarily in hospitals to prescribe more expensive drugs.

The analysis underscores the importance of adjusting for confounding variables. For example, at Asaf Harofeh, patients in the IP-DUAL group generated less than half the outpatient charges generated by patients in the CL-ONLY group (Table 8). The bulk of this difference is explained by differences in patient characteristics - particularly patient health status. Physician characteristics were markedly less important in explaining utilization differences among the two settings. The same is true with regard to the inpatient findings - the raw data indicated major inter-group differences in utilization, while most of this difference was explained by patient characteristics.

In this study we have not distinguished between those admissions and outpatient visits which took place as a result of a referral from the primary care physician and those which took place as a result of self-referral or referral from a specialist. Similarly, we did not distinguish between those drugs prescribed by the PCP and those prescribed by specialists or replacements for the PCP. This is in keeping with KHC's philosophy of the primary care physician serving as the person responsible for coordinating the care for the patient as a whole. The PCP can influence pharmaceutical and hospital utilization in a variety of indirect ways. For example, the PCP influences hospital utilization not only through the frequency of referral, but also via the convenience of his office hours (which can substitute for ER care) and the extent to which he provides a complete solution to the patients' medical problems and concerns (thereby reducing the frequency of self-referral to hospital-based specialists).

Limitations

The study has several limitations. To begin with, health services purchased on a private (out-of-pocket) basis are not included in the study. As such, the analysis relates to health expenditures of the sick fund, rather than total resource use. While it is the sick fund's own outlays which are of primary interest to the management of the sick fund, from a public policy perspective it is total resource use which is of interest. A recently completed survey of IP patients and clinic patients has yielded useful information on the use of private services by these two groups; the authors hope to publish the results of this survey in the coming months.

A second limitation relates to the study's generalizability. The analyses of hospital inpatient and outpatient utilization and of primary care costs were based on a single region which is in many ways typical of those regions in which over 10% of the members receive care from IPs. Those regions with much smaller IP programs may well differ both in their overall socioeconomic composition and in the extent to which IP members are different from clinic members. The generalizability issue is especially problematic in the case of the drug utilization analysis, where a single (albeit very large) clinic was chosen for the study. There are problems with

generalizing the hospitalization data as well; Rishon Lezion is dependent primarily on a single hospital - Asaf Harofeh - and its treatment patterns may not be representative of all Israeli hospitals.

The most serious limitation of the study is the inability, given the existing data sources, to fully control for socioeconomic differences and health status differences among the patient groups which may have arisen from various mechanisms of selection and self-selection. Ideally, data would have been available on patient ethnicity (Jew v. Arab; Sephardic v. Ashkenazic) which have been found to be related to health status and utilization in Israel. In addition, information on the number and type of chronic illness would have enriched our analysis.

The JDC-Brookdale Institute and KHC have fielded a patient survey which will provide information on education levels, income levels, and the registration process for approximately 400 patients in the Rishon Lezion region. While the numbers involved are small, we would hope to link that data with the utilization data from administrative records in the hope of developing a more refined cost analysis for this relatively small sample.

A matter of perspective

The "Findings" section presented data on resource utilization. Such data are relevant to decisions facing both regional managers and top management of the sick fund. However, managers at both levels will need to adapt the data to fit their needs.

Consider first the case of the regional manager. The budget allocated to each region is based primarily on the number of KHC members enrolled in the region, though this is modified by a variety of historical and political factors as well as some consideration for regions with large elderly populations. Accordingly, a regional manager seeking deficit-minimization (in KHC one does not speak of "profit maximization") will seek to minimize cost per member. Note that in the internal accounting systems of KHC the regional manager's budget includes allocations intended to cover the utilization of primary care, pharmaceuticals, hospital

utilization, and other purchased expenses. His account is debited on the basis of the number of hospital days for inpatient utilization, on the basis of billings for hospital outpatient utilization - when a non-KHC hospital is used, and on the basis of internal transfer prices for pharmaceuticals received from the central warehouses. Thus regional managers have an incentive to minimize the use of pharmaceutical and hospital services. [1] However, when it comes to primary care, regional managers do not face incentives which would encourage them to minimize true resource use. In particular, they are not held accountable for capital budgets and as a result would tend to underestimate the marginal costs involved in both expanding and contracting the clinic system. Thus, in terms of full cost, the clinic setting is even more attractive to the regional manager than Table 18 would suggest. On the other hand, whereas from a top management perspective the marginal cost involved in contracting the size of the clinic population is greater than their full cost (due to the fixed nature of capital costs), for the regional manager the shift from clinics to IP is not burdened by these fixed costs.

Deficit-minimization translates into somewhat different operational parameters for the top management of the sick fund, with the considerations varying somewhat depending on the region involved and the time perspective adopted. There are three primary reasons for this difference in perspective between regional management and top management.

The first reason for the difference in perspective was hinted at above: regional managers need not take capital and financing costs into account, while for top management these are very central concerns.

The second difference in perspective arises because in Kupat Holim Clalit the members' insurance premium is linked to the member's income; the wealthy subsidize the care of the poor. Thus, for the top management of the sick fund one component of the deficit minimization strategy can consist of an attempt to attract

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[1]The discussion here assumes that utilization rates can be controlled and reduced without alienating members and physicians.

and retain members with relatively high earnings.[1] For the top management, it is not the case that all members are equal from a revenue/financial perspective. It may be that from their perspective it is worthwhile to expand the independent physician model in order to retain members with relatively high earnings, even if the IP model entails higher cost per member. On the other hand, for the regional manager deficit minimization is equivalent to minimizing cost per member, as the budget is tied primarily to membership size - with no adjustment for differences in members' incomes among regions. Accordingly, his financial interest in developing the IP model would not be as great.[2] An outsider to the system is tempted to suggest that this difference in perspective is due to an error in the way top management has structured the incentives for the regional manager. The outsider might argue that the error should be corrected so that regional management will be encouraged to behave in ways which minimize the deficit of the overall organization. Insiders suggest that top management has deliberately chosen to structure the incentives at the regional level so that regional managers will treat all members the same - irrespective of income level. They prefer that those difficult and politically sensitive tradeoffs between the preservation of equity and financial concerns be made at the central headquarters level and that they be communicated to the regional level via administrative directives and informal suggestions rather than via financial incentives.[3]

The third difference in perspective arises because the charges debited to the accounts of the regional managers for hospital utilization do not reflect the true costs borne by top management. Indeed, from top management's perspective, the impact of

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[1] Note that KHC top management does not have any information on the earnings and insurance premiums of members at the individual level. This is because the collection function is handled by KHC's parent organization - the Histadrut - which for ideological reasons prefers that the HMO not know which members have contributed more than others. However, even without such micro-level data , KHC management is well-aware of the socioeconomic profiles of the various regions and districts.

[2]The regional manager might nonetheless be interested in the IP program because it provides him with an important managerial tool for rewarding physicians; see Yuval, et.al., 1991.

[3]Anecdotal evidence suggests that KHC managers are increasingly relating to young, upper-income persons as a key target population.

reducing hospital utilization on sick fund outlays varies among regions and over time.

Until 1991, in regions where KHC patients were served by government hospitals, the sick fund realized no savings from reduced utilization, at least in the short-term. This is because the sick fund payed the government a prospectively determined annual lump-sum which constitutes reimbursement in full for all services provided by government hospitals to KHC patients, as called for in the "regionalization agreement" between MOH and KHC. (Note, however, that over time the capitation-based lump-sum was adjusted for trends in utilization.) The regionalization agreement lapsed in early 1991. The lump-sum arrangement has been replaced by a mix of per-diem reimbursement and a DRG-like arrangement for 15 high-cost procedures. Reimbursement arrangements may well change again in the near future, as the government begins to reorganize its hospital system in the wake of the recommendations of the Netanyahu Commission (JDC-Brookdale Health Policy Research Unit, 1991).

Prior to 1991, the situation in regions with government hospitals contrasted sharply with the situation in the Jerusalem region, where KHC purchased hospital services from independent non-profit hospitals and payed for inpatient care on a per-diem basis and for outpatient care on a fee-for-service basis. Thus all the savings from reduced hospital utilization accrued to the sick fund. In regions such as the Negev, where hospital care is provided by a KHC-owned hospital, an intermediate situation prevailed, as the sick fund ended up saving only on the marginal cost of the hospitalizations and OPD usage. While most costs in the hospital were fixed in the short-term, over the long-term reduced utilization could be translated into a reduced rate of growth for staffing levels.

In the future, to the extent that KHC's national management does not realize financial gains from reductions in the number of hospital days generated by its members, the IP program will look less attractive than is implied by the sensitivity analysis in which days instead of admissions were used for our calculations. From the top management perspective, the cost element in which the clinic model appears to have a cost advantage - particularly primary care - would continue to be

the appropriate focus even if a conceptual case could be put together linking practice setting and length of stay.

Future directions

In May, 1988 a new Director-General was appointed for Kupat Holim and he, in turn, made changes in many senior executive posts. The new management team is less tied to the medical value orientation which characterized the previous administration. It has brought with it a more marketing-oriented and business-like approach to decisionmaking. Thus, interest has arisen, for example, in assessing the full cost implications of the two models, taking into account hospital and pharmaceutical costs, in addition to primary care costs.

One of the principal short-term objectives of the new leadership team has been to improve the primary care clinics, with special attention to the customer service dimension of care. The implementation of appointment systems, which historically were one of the hallmarks of independent physicians, and whose introduction into the clinics was begun under the previous administration, has been accelerated and such systems have been introduced in most of the urban clinics. The role of capitation payments in the reimbursement of clinic physicians has been strengthened,[1] encouraging physicians to compete with one another for patients, and total compensation of clinic physicians has been markedly increased. Perhaps, most significantly, the ability of members to select their primary care physician, and to switch from one physician to another, has been increased. It may be that these changes in the clinics will effect not only satisfaction levels and quality of care, but expenditure levels as well.

These changes are narrowing the differences in organizational and financial arrangements between the clinic and IP models, but the two are still quite distinct. Traditional differences with regard to the physician-sick fund relationship and the practice setting remain. In the reimbursement area substantial differences remain;

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[1]Note that, as a result, a far greater proportion of physician labor costs will be variable under Scenario C (the reduction of physician list sizes) and the marginal cost analysis will have to be updated accordingly.

for IPs, capitation fees account for 100% of their income while for clinic physicians capitation fees are expected, on average, to account for at most 25% of income.

6 CONCLUSIONS

KHC management is giving serious consideration to expanding the IP program as part of its effort to compete with the smaller sick funds, but has been hesitant about doing so because of fears that such an action would greatly increase costs. Our study suggests that, in terms of overall resource use, the IP program is 10% more expensive than the clinic program. This differential could be eliminated if the IP capitation rate is reduced by approximately one-third. [1] Even if the differential is not eliminated, it may be in KHC's financial interest to expand the IP program if marketing efforts can be successfully targeted on healthy, high-income persons who might otherwise join another sick fund.[2]

Clearly, decisions about whether to expand or contract the IP program will not depend on financial considerations alone. KHC, together with the Brookdale Institute, is exploring the impact of the two practice modes on quality of care, patient satisfaction, and employee satisfaction so that these important policy decisions can be made with as much relevant information as possible.

The findings presented in this study underscore the importance of looking beyond primary care costs in analyzing the expenditure impact of various primary care programs. Relatively small percentage differences in hospitalization costs can offset major differences in primary care costs. Even if hospitalization costs prove to be equal among the programs being compared, including them in the analysis can serve to moderate the impact of primary care cost differences upon total expenditures in percentage terms.

[1] While eliminating the gap in primary care costs requires a 44% reduction in the capitation rate, a reduction of one-third is sufficient to eliminate the gap in total costs.

[2] There may be other, less costly ways for KHC to ensure that healthy, high income persons do not switch to competing HMOs. KHC should compare the costs and benefits of the various steps (including expansion of the IP program) which could be taken to advance this important objective.

The study also demonstrates that it is possible to carry out low-cost, reasonably valid analyses regarding hospital inpatient and outpatient expenditures using existing data sources. In the case of studies of pharmaceutical costs, the situation is less promising; no computerized records currently exist for the pharmacies and our endeavors here were far more expensive and our findings far less convincing. As Kupat Holim Clalit is currently experimenting with a variety of changes in the organization of primary care (scheduling systems, changes in the role of the nurse, etc.), it would be well advised to explore the impact of these changes upon hospitalization costs. Our study underscores the feasibility of carrying out such analyses and demonstrates a methodology for controlling for provider and patient characteristics. At the same time, it highlights the importance of investing in the development of improved information systems for tracking utilization and costs in the outpatient and pharmaceutical areas.

The analysis presented in this paper was carried out over the course of 1989 and was presented to KHC management in early 1990. In the case of several of the cost elements, the analysis relied on data from years prior to 1989. The economics and organizational characteristics of the health care system are constantly changing and accordingly readers of this paper may need to adjust the findings presented here to reflect recent developments. Indeed, several significant changes have already occurred between the conclusion of the research and the publication date of this paper (February, 1992):

1. KHC has made a major effort to improve the clinics with regard to service levels and physical appearance. In addition, the wages of clinic personnel have risen more rapidly than the capitation rate for the IPs. These two factors have probably increased the cost of clinic care relative to IP care.

2. The formula governing distribution of the employer tax monies among the sick funds has been changed; the system is now more redistributive. As a result, while it is still more profitable for a sick fund to attract and retain wealthy persons than poor persons, the differential is not as great as it used to be. The financial incentive to target expansion of the IP program at upper-income persons is not as great as implied in the profit/loss analysis presented in the findings section.

3. As a result of the massive immigration from the Soviet Union, KHC membership levels have begun to rise. Whereas in the past expansion of the IP program would have had to come primarily at the expense of the number of persons in the clinics, now this is no longer the case. The managerial decision now facing KHC is whether to meet the increased demand through expansion of the IP program, the building of additional clinics, or an increase in the number of members per clinic.

No doubt, additional changes will occur in the years ahead, and the analysis presented here will have to be updated accordingly.

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APPENDIX A MULTIVARIATE ANALYSIS OF INPATIENT UTILIZATION DATA

The logit analysis for the inpatient data (Table A-1) suggests little if any difference among the four patient groups in the likelihood of being admitted once or more in the course of 1987. Of the three dummy variables representing the patient groups other than CL-ONLY, only in the case of CL-DUAL is the regression coefficient greater than the standard error of the coefficient. The variables representing the patient's health status, location, age and socioeconomic status had t-statistics in excess of 1.0. Overall, the equation produced a reasonable fit, with a p value of .300 for the Pearson's chi square.

Note that the SPSS PROBIT program (logit option) which was used to carry out the logit analysis, employs the following model in order to facilitate convergence:

$$(LOG(P/1-P))/2 + 5 = INTERCEPT + BX.$$

As a result, the results in the printout were adjusted by subtracting 5 from the intercept and then multiplying the entire logit by 2. Table A-1 presents the unadjusted and adjusted coefficients for the first of the five runs.

Table A-2 presents the calculations for estimating the relative probabilities of being admitted at least once for the four patient groups of interest. The calculations were carried out twice, once for members in categories with a low-likelihood of being admitted (e.g., Drafted, Welfare, etc.) and once for members in high-likelihood categories (e.g., Chronic, Old, etc.). The first line of each table presents the "implied probability" from setting the relevant dummy variables to one.

However, these probabilities relate to the subsample included in logit analysis and, as noted above, only a 10% sample of members who were never admitted was included.

To get an estimate of the true probability of being admitted once or more for the full sample, we multiplied the implied probability by a correction factor of .152. This was done to take into account the 10% sampling from among the members never admitted. These "true probabilities" are listed on the third line of the Table. The .152 figure - found in the second line of the Table -was calculated as follows:

1. The full sample of 14,841 members included 864 members admitted once or more - 5.8% of the full sample. This full sample also included 13,977 members never admitted.

2.The subsample used for the logit analysis included only 1,398 members never admitted - 10% of the 13,977 members in the full sample who had never been admitted in the course of 1987. As all 864 members admitted once or more were included in the logit analysis, a total of 2,262 cases were included in the analysis. The 864 members included once or more constitute 38.2% of these 2,262 cases.

3. 5.8% divided by 38.2% is 0.152.

The fourth line on the tables lists the standardized use rates which were computed using CL-ONLY as the basis for the standardization. Averaging the two scenarios suggests that, in relation to CL-ONLY members, CL-DUAL patients have a 6% lower chance of being admitted, all else being equal, while for IP-ONLY and IP-DUAL the comparable figures are 3% lower and 1% lower, respectively.

Table A-3 presents the results of the OLS regression in which log(admissions) served as the dependent variable (and from which patients with 0 admissions were excluded). The R-squared is only .07, suggesting that only a very small portion of the total variance has been explained. The coefficients of IP-DUAL, CL-DUAL, AND IP-ONLY are all negative, but are not significantly different from zero.

The analogous model using "log (days)" as the dependent variable (Table A-4) proved more amenable. The R-squared here is 0.16. The coefficients for IP-DUAL and IP-ONLY are significantly different from zero at the .05 level. Other variables exhibiting a strong relationship with "log (days)" were: Chronic, Male, Rural, Welfare, Drafted, Deceased, and Months. The -0.247 coefficient for IP-DUAL implies

that (among members hospitalized at least once) members in this category use $e^{.247}$ (or 22%) fewer days than members in the CL-ONLY category, while the -.227 coefficient for IP-ONLY implies $e^{.227}$ (or 20%) fewer days for those patients compared with CL-ONLY patients.

Table A-1

Logit Analysis for Inpatient Data
Dependent Variable = Dummy for
"Admitted Once or More"

	B	COEFF/ S.E.
CL-DUAL	-0.156	-1.114
IP-ONLY	-0.062	-0.284
IP-DUAL	-0.022	-0.149
Young	0.554	3.551
Old	0.864	4.596
Male	-0.150	-1.531
Isr Grad	-0.154	-0.597
Int Med	-0.040	-0.106
Fam Phys	-0.024	-0.111
Young Md	0.112	0.903
Old Md	0.064	0.395
Male Md	-0.014	-0.113
Also CL	0.182	0.728
Months	0.026	0.419
Deceased	2.022	5.293
Drafted	-0.706	-1.748
Suspend	-0.246	-0.676
Welfare	-1.158	-3.552
Rural	0.634	2.963
Ramle	0.402	2.451
Lod	0.424	2.904
Chronic	1.096	7.718
Constant	-1.360	11.221

PEARSON GOODNESS-OF-FIT CHI SQUARED = 2016.586

DF = 1984 P = .300 N = 2,007

Table A-2

Logistic Analysis for Inpatient Data - Calculation of Standardized Probability of Being Admitted at Least Once

I: For members in low likelihood categories

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Implied probability	0.08	0.07	0.07	0.07
Correction factor	0.152	0.152	0.152	0.152
True probability	0.012	0.010	0.011	0.011
Standardized probability	1.00	0.87	0.94	0.98

II: For members in high likelihood categories

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Implied probability	0.99	0.99	0.99	0.99
Correction factor	0.152	0.152	0.152	0.152
True prob	0.151	0.150	0.151	0.151
Standardized probability	1.00	1.00	1.00	1.00

Table A-3

OLS Regressions for Log (Admissions)

	B	T
IP-DUAL	-0.056	-1.143
CL-DUAL	-0.045	-0.978
IP-ONLY	-0.034	-0.586
Male	-0.017	-0.531
Old	-0.016	-0.333
Young	-0.032	-0.615
Chronic	0.121 **	2.951
Lod	-0.063	-1.370
Rural	-0.086	-1.246
Welfare	-0.214 **	-2.184
Ramle	-0.053	-1.039
Drafted	0.427 **	2.512
Suspend	0.184	1.426
Months	0.048 **	3.000
Deceased	0.482 **	6.260
Old MD	-0.030	-0.545
Young MD	0.013	0.317
Male MD	0.011	0.275
Int med	-0.036	-0.263
Fam phys	-0.015	-0.224
Also CL	0.002	0.026
Isr grad	0.144 *	1.674
Constant	-0.367	-1.808

*Significant at .10 level

** Significant at .05 level.

R-SQUARED = .07 N = 864

Table A-4

OLS Regressions for Log (Days)

	B	T
IP-DUAL	-0.247 **	-2.398
CL-DUAL	0.010	0.102
IP-ONLY	-0.227 *	-1.846
Male	0.147 **	2.162
Old	0.038	0.376
Young	-0.176	-1.615
Chronic	0.511 **	5.874
Lod	-0.133	-1.371
Rural	-0.343 **	-2.349
Welfare	-0.530 **	-2.573
Ramle	-0.099	-0.925
Drafted	0.712 **	2.000
Suspend	0.001	0.004
Months	0.073 **	2.086
Deceased	1.232 **	7.605
Old MD	0.171	1.487
Young MD	0.082	0.953
Male MD	0.155 *	1.824
Int med	-0.409	-1.420
Fam phys	-0.128	-0.908
Also CL	0.036	0.225
Isr grad	0.127	0.702
Constant	0.284	0.667

*Significant at .10 level

** Significant at .05 level.

R-SQUARED = .16 N = 864

APPENDIX B MULTIVARIATE ANALYSIS OF OUTPATIENT UTILIZATION DATA

The logit analysis for the outpatient data (Table B-1) suggests that, overall, the model fit reasonably well, with a p value of .374 for the Pearson's chi square. However, the ratios of the coefficients of CL-DUAL, IP-ONLY, and IP-DUAL to their standard errors suggest that there may well be differences among our four patient groups in the likelihood of visiting the Asaf Harofeh hospital outpatient department once or more in the course of April or May of 1989.

Table B-2 presents the calculations for estimating the standardized probabilities of visiting the OPD at least once for the four patient groups of interest. As in the case of the inpatient data, the calculations were carried out twice, once for members in categories with a low-likelihood of being admitted and once for members in high-likelihood categories. The post-correction use ratios suggest that, in comparison with the CL-ONLY group, the likelihood of visiting at least once was 14% higher for CL-DUAL, 22% higher for IP-ONLY and 12% higher for IP-DUAL.

Table B-3 presents the results of the OLS regression in which log (outpatient visits) served as the dependent variable (and from which patients with 0 visits were excluded). The R-squared here is even lower than in the inpatient analysis - just 0.016. The coefficients of IP-DUAL, CL-DUAL, and IP-ONLY are all negative, with the coefficient of CL-DUAL significantly different from zero at the .10 level. In contrast to the inpatient regressions, the age and health status variables were not significant. Perhaps the fit for the inpatient data was superior because there we were working with a full year's worth of data, whereas here we had two months of data only.

The analogous model using log (outpatient costs) as the dependent variable is presented in Table B-4. The R-squared here is only slightly higher - 0.025. The coefficient for IP-DUAL is significantly different from zero at the .10 level.

Remarkably, its relationship with the dependent variable is stronger than that of any of the other variables in the equation - including Chronic and Welfare, in terms of the T-statistic. The -0.227 coefficient for IP-DUAL implies that (among members visiting Asaf Harofeh at least once) members in this category generate $e^{-.227}$ (or 20%) lower charges than members in the CL-ONLY category. Note, however, that because of the low R-squared theses numbers should be used cautiously.

Table B-1

Logit Analysis for Outpatient Data

Dependent Variable = Dummy for Visited Once or More

	B	B/ S.E.
CL-DUAL	0.276	1.725
IP-ONLY	0.394	1.728
IP-DUAL	0.224	1.333
Young	0.534	2.811
Old	0.488	2.568
Male	-0.236	-2.185
Isr grad	-0.170	-0.563
Int med	-0.298	-0.654
Fam phys	-0.110	-0.444
Young MD	0.242	1.862
Old MD	-0.112	-0.596
Male MD	0.016	0.119
Also CL	0.374	1.520
Welfare	-0.422	-1.147
Rural	0.362	1.534
Ramle	0.288	1.600
Lod	0.268	1.740
Chronic	1.178	8.414
Constant	-1.444	51.542

PEARSON GOODNESS-OF-FIT CHI SQUARED = 1711.950

DF = 1,693 N = 1,712 P = .368

Table B-2

Logistic Analysis for Outpatient Data Calculation of Standardized Probabilities of Visiting the OPD at Least Once

I: For members in high likelihood categories

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Implied probability	0.87	0.90	0.91	0.90
Correction factor	0.14	0.14	0.14	0.14
True prob	0.122	0.126	0.127	0.125
Standardized probability	1.00	1.03	1.04	1.03

II: For members in low likelihood categories

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Implied probability	0.17	0.21	0.23	0.20
Correction factor	0.14	0.14	0.14	0.14
True prob	0.024	0.029	0.032	0.028
Standardized probability	1.00	1.25	1.37	1.20

Table B-3

OLS Regressions for Log (Visits)

	B	T
IP-DUAL	-0.091	-1.569
CL-DUAL	-0.096 *	-1.778
IP-ONLY	-0.048	-0.696
Male	-0.002	-0.054
Old	0.034	0.708
Young	-0.057	-0.891
Chronic	0.014	0.333
Lod	-0.071	-1.365
Welfare	-0.009	-0.076
Ramle	-0.012	-0.214
Rural	0.022	0.297
Old MD	-0.016	-0.235
Young MD	0.009	0.200
Male MD	0.037	0.804
Int med	-0.140	-0.848
Fam phys	-0.069	-0.784
Isr grad	-0.014	-0.139
Also CL	0.008	0.104
Constant	0.308 **	5.404

*Significant at .10 level

** Significant at .05 level.

R-SQUARED = .016 N = 621

Table B-4

OLS Regressions for Log (Out-Patient Costs)

	B	T
IP-DUAL	-0.227 *	-1.846
CL-DUAL	-0.116	-1.000
IP-ONLY	-0.063	-0.429
Male	-0.048	-0.608
Old	0.064	0.621
Young	0.041	0.299
Chronic	0.102	1.146
Lod	-0.078	-0.703
Welfare	0.143	0.563
Ramle	0.158	1.317
Rural	0.087	0.554
Old MD	0.089	0.618
Young MD	-0.044	-0.458
Male MD	0.098	1.000
Int med	-0.431	-1.224
Fam phys	-0.121	-0.647
Isr grad	0.057	0.266
Also CL	0.018	0.110
Constant	4.510 **	36.967

*Significant at .10 level
**Significant at .05 level.

R-SQUARED = .025 N = 621

APPENDIX C MULTIVARIATE ANALYSIS OF PHARMACEUTICAL DATA

The logit analysis for the pharmaceutical data (Table C-1) suggests that, overall, the model fit rather well, with a p value of .536 for the Pearson's chi square. Note that the absolute values of the t-statistics for both IP dummy variables are greater than 1.0, and suggest non-negligible differences among the four patient groups in the likelihood of receiving one or more prescriptions in the course of April, 1989.

As mentioned in the main text, the multivariate analysis of the pharmaceutical data did not adjust for physician characteristics. This was because these data were from one clinic only, and as such there were not enough physicians to support a fuller analysis of the impact of physician characteristics on prescribing behavior.

Table C-2 presents the calculations for estimating the standardized probabilities of getting one or more prescriptions for the four patient groups. As in the case of the hospital data, the calculations were carried out twice, once for members in categories with a low-likelihood of receiving one or more prescriptions and once for members in high-likelihood categories. As in the other analyses, we took the average of the two Tables for our subsequent calculations. The post-correction use ratios suggest that, in comparison with the CL-ONLY group, the likelihood of receiving at least one prescription was 2% lower for CL-DUAL, 10% higher for IP-ONLY and 12% lower for IP-DUAL.

Table C-3 presents the results of the OLS regression in which log (number of drugs prescribed) served as the dependent variable (and from which patients with no prescriptions were excluded). The R-squared here is .02 and the F statistic is 1.7. The coefficients of IP-DUAL, IP-ONLY, and CL-DUAL are .25, .01 and .00, respectively. The coefficient of IP-DUAL is significant at the .05 level and the point estimate suggests that among patients with one or more prescriptions, in comparison with CL-ONLY patients, IP-DUAL patient tend to have 28% more prescriptions. Perhaps the benefit/cost ratio of traveling to the clinic pharmacy is

greater if more than one medication is involved. Note, however, that this effect is not evident in the case of the IP-ONLY group.

The analogous model using log (pharmaceutical costs) as the dependent variable is presented in Table C-4. The R-squared here is .05 and the F statistic is significant at the .01 level. The coefficient for IP-DUAL is .21, while for IP-ONLY it is .20 and for CL-DUAL it is -0.13. This suggests that, given that one or more drugs were prescribed, the IP patients tend to be associated with higher pharmaceutical costs. Note, however, that none of these variables are significant at the .10 level. The model's explanatory power derives primarily from the demographic and health status variables.

Table C-1

Logistic Regression Results for Pharmaceutical Data

	B	B/ S.E.
CL-DUAL	-0.038	-0.311
IP-ONLY	0.186	1.453
IP-DUAL	-0.246	-1.017
Young	-0.608	-1.543
Old	0.740	5.692
Male	-0.394	-3.940
Welfare	-0.172	-0.503
Chronic	1.662	14.328
Constant	-2.440	82.174

P=.536 N = 4,287

Pearson goodness of fit Chi-squared=4269

Table C-2

Logistic Analysis for Pharmaceutical Data Calculation of Standardized Likelihoods Of Receiving One or More Prescriptions

I: For members in high likelihood categories

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Implied probability	0.86	0.85	0.88	0.82
Correction factor	0.169	0.169	0.169	0.169
True probability	0.145	0.144	0.148	0.139
Standardized probability	1.00	0.99	1.02	0.96

II: For members in low likelihood categories

	CL-ONLY	CL-DUAL	IP-ONLY	IP-DUAL
Implied probability	0.14	0.14	0.17	0.12
Correction factor	0.169	0.169	0.169	0.169
True probability	0.024	0.023	0.028	0.020
Standardized probability	1.00	0.97	1.17	0.81

Table C-3

OLS Regression Results for Log (Number of Drugs Prescribed)

	B	T
IP-DUAL	0.254 **	2.280
IP-ONLY	0.006	0.107
CL-DUAL	-0.001	-0.021
Male	0.035	0.781
Old	0.112 **	2.108
Young	0.143	0.718
Chronic	0.032	0.833
Welfare	0.031	0.250
Constant	0.389 **	8.922

** Significant at .05 level.

R-SQUARED = .02 N = 553

Table C-4

OLS Regression Results for Log (Pharmaceutical Costs)

	B		T
IP-DUAL	0.206		0.807
IP-ONLY	0.201		1.172
CL-DUAL	-0.133		-0.792
Male	0.382	**	2.772
Old	-0.139		-0.863
Young	-.031		-0.052
Chronic	0.594	**	3.819
Welfare	-0.069		-0.168
Constant	1.201	**	9.066

** Significant at .05 level.

R-SQUARED = .05 N = 553

APPENDIX D THE PRIMARY CARE COST ANALYSIS

The analysis of primary care costs entailed three major steps:

1. Assessment of full primary care costs for the region as a whole.
2. Allocation of those full costs to the two practice modes.
3. Identification of fixed and variable cost components for a variety of assumptions and scenarios.

This appendix provides details on each of the three steps.

The budget division of KHC provided a breakdown of full costs for the Rishon Lezion region for fiscal year 1989 in terms of April 1989 NIS. Depreciation expenses assumed a lifetime of 50 years for buildings, 15 years for mechanical and electrical systems and 10 years for equipment. Real financing costs were calculated as 12% of total assets per year. Maintenance costs were figured at 3% of asset value per year for buildings and systems, 8% for medical equipment and 3% for other equipment.

The analysis ignores the small amount of community-based specialty care provided within KHC community clinics, and treats all expenditures on community-based services as if they are primary care services.

As indicated in Table D-1, the full cost of primary care provision in Rishon Lezion in 1989 (on an accrual basis) is approximately 31,115,000 NIS, or roughly 167 NIS per member. Approximately 4,000,000 NIS went to independent primary care physicians as compensation for their services. Of the roughly 27,000,000 NIS spent in the clinics and on regional infrastructure, approximately 22,000,000 NIS was for personnel costs.

Table D-1

Full Cost By Major Line Item

In April 1989 NIS

	Full Costs
GPs	7,482
Pediatricians	2,628
Clerks	2,405
Maintenance	1,440
Nurses	4,464
Specialists	805
Lab Workers	581
Pharmacists	1,966
Paraprofessionals	523
Others	37
Subtotal personnel	22,330
Non-personnel	
Operating expenses	1,707
Depreciation	764
Financing	1,528
Maintenance	764
IP Adult	3,194
IP Child	828
Full total	31,115
Full per member	167

Tables D-2 and D-3 provide the data used to allocate the full actuarial costs among the two practice arrangements. Senior KHC managers, physicians and nurses were asked to estimate how much of the time of various categories of personnel would be taken up by a single IP patient and a single clinic patient. The median response, presented in Table D-2, was used in our calculations. For example, it was estimate that clinic nurses would spend four times as much time on a typical clinic patient than on a typical IP patient. On the other hand, the two types of patients would make roughly equal demands on laboratory personnel. Usage of the clinic facility was estimated to be much heavier by clinic patients than IP patients and building-related costs were allocated accordingly.

Table D-2

Relative Usage - IP Patients And Clinic Patients

	Per Member	
	Clinic Share	**IP Share**
GPs	1.0	0.0
Pediatricians	1.0	0.0
Clerks	0.6	0.4
Maintenance	0.9	0.1
Nurses	0.8	0.2
Specialists	0.5	0.5
Lab Workers	0.5	0.5
Pharmacists	0.5	0.5
Paraprofessionals	0.5	0.5
Others	0.5	0.5
Subtotal personnel		
Non-personnel		
Operating expenses	0.9	0.1
Depreciation	0.9	0.1
Financing	0.9	0.1
Maintenance	0.9	0.1
IP Adult	0.0	1.0
IP Child	0.0	1.0

Of course, the allocation of costs among the two programs also depends on the relative size of the two programs. Only 12% of the region's members receive care from IPs while 88% receive care in the clinics. These figures were combined with the relative usage figures in Table D-2 to produce an allocation of full costs by major line item between the two programs - presented in Table D-3. Note that all the nursing costs charged to the IP program are for the use of clinic-based nurses by IP patients. It is quite rare for independent physicians to employ nurses in their private office settings. In those cases where they do so, the IPs do not receive additional compensation from the sick fund and must finance the additional expense out of their capitation fees.

Table D-3

Allocation of Full Costs Between IP and Clinic Patients in April 1989 NIS

	Clinic Costs	IP Costs	Full Costs
GPs	7,482	0	7,482
Pediatricians	2,628	0	2,628
Clerks	2,207	201	2,405
Maintenance	1,418	22	1,440
Nurses	4,316	148	4,464
Specialists	708	97	805
Lab Workers	511	70	581
Pharmacists	1,729	237	1,966
Paraprofessionals	460	63	523
Others	32	4	37
Subtotal personnel	21,487	841	22,330
Non-personnel			
Operating expenses	1,681	26	1,707
Depreciation	753	11	764
Financing	1,505	23	1,528
Maintenance	753	11	764
IP Adult	0	3,194	3,194
IP Child	0	828	828
Full total	26,180	4,935	31,115
Full per member	160	217	167
Percent of members	88%	12%	

Movement from a full cost to a variable cost analysis entails identification of fixed and variable cost elements. Table D-4 depicts which cost elements were deemed fixed in each of the the three scenarios discussed in the text. Note that the percentage of physician costs which are variable for Scenario C will increase as KHC introduces more elements of capitation within the clinics.

Table D-4

Cost Elements Treated as Fixed
in Each of the Three Scenarios

	SCENARIO A (clinic closures)	**SCENARIO B (reduction in number of MDs)**	**SCENARIO C (reduction in clinic MD's lists)**
GPs			90% FIXED
Pediatricians			90% FIXED
Clerks		FIXED	FIXED
Maintenance		FIXED	FIXED
Nurses			FIXED
Specialists			
Lab workers			
Pharmacists		FIXED	FIXED
Paraprofessionals			
Others			
Depreciation		FIXED	FIXED
Financing		FIXED	FIXED
Maintenance		FIXED	FIXED

APPENDIX E VARIABLES USED IN THE REGRESSION ANALYSES

PATIENT GROUP ..... (Default = CL-ONLY)
CL-DUAL ..... Patients cared for in the clinics by physicians who work in both settings.
IP-ONLY ..... Patients cared for in the physician's private office by physicians who work in the IP setting only.
IP-DUAL ..... Patients cared for in the physicians' private office by physicians who work in both settings.

AGE GROUPS ..... (Default = Patients aged 4 to 64)
Young ..... Patient less than 4 years old.
Old ..... Patients aged 65+.
Baby..... Patients less than one year old.
Child..... Patients aged 1-3
Yng-Old..... Patients aged 65-74
Old-Old ..... Patients aged 75+

PATIENT SEX ..... (Default = female)
Male ..... Patient is male.

PHYSICIAN AGE ..... (Default = physician aged 45 to 60)
Young MD..... Physician aged less than 45
Old MD..... Physician aged over 60.

PHYSICIAN SPECIALTY ..... (Default = other or none)
Fam phys ..... Licensed in family practice
Int med ..... Licensed in internal medicine

PATIENT RESIDENCE ..... (Default = city of Rishon Lezion)
Ramle ..... Patient lives in city of Ramle
Lod ..... Patient lives in city of Lod
Rural ..... Patient lives outside the region's 3 major cities

PATIENT HEALTH STATUS ...(Default = no chronic conditions)
Chronic ..... Patient has one or more chronic conditions

PHYSICIAN SEX ..... (Default = female physician)
Male MD..... Male physician

MEMBERSHIP CLASS .....(Default = all other membership classes)
Welfare .....Patient's insurance premiums paid by National Insurance Institute

COUNTRY IN WHICH PHYSICIAN COMPLETED MEDICAL SCHOOL .....(Default = all others)
Isr grad .....Physician graduated Israeli medical school

ACTIVITY STATUS .....(Default = active entire year)
Deceased .....Member died in course of year
Drafted .....Membership inactive due to conscription
Suspend .....Membership suspended due to non-payment of premiums
Months .....Number of active months

APPENDIX F DETAILS OF THE PROFIT AND LOSS ANALYSIS

The calculations for the profit and loss analysis were based on the following assumptions:

1. Enrollment in the IP program in Rishon Lezion is increased by 16,000 members (10% of current clinic enrollment in the region), an increase in IP enrollment of roughly 70%.

2. Two scenarios were explored with regard to what these "new participants" would do if the IP program were not expanded. In Scenario 1, the 16,000 new participants in the IP program are all persons who would otherwise get care in the clinics ("loyalists"). In Scenario 2 the 16,000 new participants are all persons who would not otherwise be part of KHC ("shoppers").

3. The cost to KHC for the average new participant in the shopper group will be the same as the cost for current IP members. As noted in the "Summary of Findings and Synthesis", the unadjusted total cost for the average current IP member in 1989 was $366; $56 of this is overhead and $310 reflects operating costs.

4. We assumed a family size of 4 persons for all new participants - a husband, a wife and two dependent children. With regard to the income levels of the shoppers who join the program, we consider 2 scenarios:

   Scenario X: Husband works full-time earning the 1989 national average wage (1,800 NIS or $900 / month); wife works half-time earning 900 NIS or $450/month. (All income figures are gross income and include only those income elements which must be taken into account in computing payments to the National Insurance Institute.)

Scenario Y.:Husband and wife both work full-time, with each earning in excess of 6,010 NIS or $3,050/month (income above that level is exempt from the health insurance levies).

5. We adopt the "middle-case" scenario (Scenario B) with regard to whether clinic costs are fixed. In addition, the institution's 15% central office overhead is viewed as fixed. All other costs are treated as variable. (Note that if some of the hospitalization costs are fixed, adding "shoppers" will be less costly than our analysis implies. Similarly, if clinic costs are as variable as implied by Scenario A, the movement of "loyalists" from the clinic to the IP program will be less costly than our analysis implies.)

6. The employer contribution for health insurance is 4.95% of income, up to $3,050 of gross income/month. Some of this money is retained by the NII to cover administrative expenses. However, this constitutes a very small percentage of the total and for the purposes of this analysis we assumed that all of the money collected from the employers is passed on to the sick funds. In 1989, 80% of the funds in the NII pool were distributed among the sick funds in proportion to the contributions made on behalf of their members while 20% of the funds were distributed in proportion to the number of members on whose behalf employer contributions are made. (Note that as a result of legislative changes enacted in 1991, currently 75% of the NII monies are now distributed in proportion to the number of members and only 25% of the monies are distributed in proportion to the contributions made on behalf of each sick fund's members.

7. The member's direct contribution is based on:
   a) income,
   b) whether the member has children and/or a spouse, and
   c) whether the spouse is a member who pays premiums to the sick fund.

   For example, under Scenario X, the husband would pay 93 NIS/month and the wife 30 NIS, for a total of 123 NIS/month. Under Scenario Y the husband would pay 295 NIS, and the wife 219 NIS for a total of 514 NIS/month.

8. The Histadrut takes 30% off the top from all employee health contributions before passing the money on to KHC.

9. The average clinic patient is associated with annual expenditure of $366 while if the same patient moves to the IP setting he will incur expenditure of $401. Operating costs will account for $345 of those $401.

10. KHC receives various subsidies from the government. It is assumed that the size of these subsidies are not tied to the number of members.

These assumptions imply the following:

Cost Implications (Scenarios 1 and 2)

- Shifting 16,000 loyalists (Scenario 1) from the clinic to the IP program (10% of clinic volume) entails an increase of 1.7 million NIS or $850,000 million in primary care costs (Table 14). Other operating costs - aside from primary care - increase by an average of $8/member shifted or roughly $150,000. Total costs increase by approximately $1 million. This shifting of patients from the clinic to the IP setting does not affect revenues in any way, so this is pure loss.

- Adding 16,000 new, relatively healthy, members to the sick fund (Scenario 2), adds $310 per member of additional variable cost. For the group as a whole, the added cost would be $4.8 million.

Revenue Implications (Scenarios X and Y)

- Under Scenario X (middle-income persons), KHC would receive $1,319 per family. 16,000 people translates into 4,000 families of four and revenues of $5.3 million. (Note that under Scenario 2 this is additional income while under Scenario 1 the sick fund already gets this income).

- Under Scenario Y (upper-income persons), KHC would receive $4,899 per family. 16,000 people translates into 4,000 families of four and revenues of

$19.6 million. (Note again that under Scenario 2 this is additional income while under Scenario 1 the sick fund already gets this income).

Synthesis: Profit and Loss Implications

Four possible combinations are possible: 1X (mid-income loyalists), 1Y (upper-income loyalists), 2X (mid-income shoppers), and 2Y (upper-income shoppers). The impact on the bottom line in each of these combinations is summarized in Table F-1.

The Table suggests that expansion would be unprofitable if it entails merely shifting people who would otherwise remain in the clinics to the IP program. On the other hand, if the expansion involves persons who would otherwise leave KHC (or not join KHC), it would probably be profitable.

Indeed, Scenario 2Y is extremely profitable. However, it is extremely unlikely, as relatively few persons in Israel have earnings in excess of four times the national average. Moreover, it is unlikely that KHC could limit the program exclusively to the wealthiest classes, even if it wanted to. This admittedly extreme scenario is presented to underscore the sensitivity of the calculations to the income levels of the new participants in the IP program. It should also be noted that the figures presented here are based on conditions which prevailed in 1989, prior to the change in the employer tax law noted above. If the new formula had prevailed in 1989, the revenue figure for "upper-income shoppers" would have been 13.9 instead of 20.7 and the profit figure would have been 9.1 instead of 15.9. The scenario would still have been a very profitable one, but less profitable than implied by Table F-1.

Perhaps the key finding is implied by Scenario 2X. If the growth is fueled by persons who would otherwise leave KHC, it is profitable, even if it is composed entirely of middle income persons. A break-even analysis indicated that if the new participants are all "shoppers", then KHC would break-even even if their income was <u>10% below</u> the national average (that is 1,600 NIS for the husband and 800 NIS for the wife).

Table F-1

The Impact of IP Program Growth (16,000 New Participants) on KHC Revenues and Costs (millions of US $/ Year)

	REVENUE	COST	PROFIT
Mid-income loyalists (Scenario 1X)	0.0	1.0	-1.0
Upper-income loyalists (Scenario 1Y)	0.0	1.0	-1.0
Mid-income shoppers (Scenario 2X)	5.3	4.8	+0.5
Upper-income shoppers (Scenario 2Y)	20.7	4.8	+15.9

The overall message of Table 24 is that the profitability of expanding the IP program appears to depend critically on two factors: the extent to which new participants would otherwise leave the sick fund, and their income levels. KHC management must make its own detailed assumptions in order to forecast the profitability of expansion. In particular, KHC management must assess whether it is desirable as well as feasible to focus the IP program on upper income groups.

APPENDIX G RELATED DATA FROM THE SURVEY OF KHC MEMBERS

The JDC-Brookdale Institute/Kupat Holim Clalit collaborative program of research regarding the independent physician program, comprises several inter-related research efforts:

1. An analysis of the historical and organization context of the IP program (Yuval et.al, 1991)..

2. An analysis of expenditures and utilization based on administrative records (reported in this paper)

3. A household survey of KHC members regarding enrollment procedures, quality of care, utilization, satisfaction, and various dimensions of service (findings to be published shortly).

Both the analysis of administrative records and the household survey provided data on utilization. This appendix highlights the areas in which the household survey data supplements the findings presented in the main body of this paper (ancillary services) as well as the most significant areas in which the two studies appear to be in conflict. In addition, this appendix summarizes information from the membership survey regarding the incomes of various groups of KHC members, which are relevant to the profit/loss analysis presented in this paper.

Utilization of Ancillary Services

The analysis of expenditures based on administrative records made use of existing data on hospitalizations, hospital outpatient use, pharmaceutical care and primary care. No data were available on the use of various ancillary services (such as laboratories and imaging services). Our analysis assumed that the utilization rates

of clinic patients and independent physician patients would be equal for those services.

The patient survey included questions on utilization of a wide range of services. The findings from the survey regarding the use of ancillary services support the assumptions made in this paper.

Nursing Services

The same cannot be said regarding utilization of nursing services. In this paper, we assumed that the average clinic patient makes use of nursing services four times as intensively as the average IP patient (see Table D-2). This assumption was based on discussions with nurses and physicians from the field. The patient survey indicates that the ratio is 2.5 rather than 4. If the ratio from the patient survey had been incorporated in Table 13, annual per member nursing costs would have been 23 for clinic members and 9 for IP members (as opposed to 26 and 6, respectively, in our analysis). Full primary care costs would have been 157 for clinic members and 219 for IP members (as opposed to 160 and 217 in our analysis). Thus, while the finding from the survey has relevance for analyses of nursing costs and for analyses of nursing manpower needs, it does not significantly affect the overall findings of this paper.

Hospitalization over The Past Year

There is an apparent contradiction between the findings from the two data sources regarding the percent of members hospitalized once or more over the past year. As Table G-1 indicates, the household survey yielded significantly higher estimates in the case of each of the four patient groups. In addition, the rankings of the groups differ. While CL-ONLY had the highest rate in the administrative records data, it had the lowest rate in the household survey data. Instead, IP-DUAL and CL-DUAL had the highest rates.

Even before we attempt to analyze the differences between the two sets of findings, it is important to emphasize that the hospital cost component of the expenditure study presented in this paper is based primarily on the variable "number of

admissions", not the variable "admitted once or more". The household survey did not include a question on the number of admissions in the past year. Therefore, even if it is felt that the survey data are to be relied upon more than the administrative records data (itself a questionable contention), the findings presented in Table G-1 would not lead us to abandon the conclusions reached in this paper. On the other hand, the inconsistency between the two data sources is troubling, and begs explanation.

Table G-2 summarizes the major differences between the two data sources. The higher hospitalization rates found in the membership survey may be accounted for, in part, by the significantly higher concentration of elderly in the survey sample (which was restricted to adults) and the fact that the administrative records data are limited to hospitalizations financed by KHC. On the other hand, the exclusion of hospitalized and institutionalized persons from the survey should have brought down the hospitalization rate, even though the number of respondents involved is small.

Various differences in the study populations, the sampling methodology and the types of hospitalizations included in the analysis may also account for the differences in the relative rankings of the four groups. In addition, the administrative records study was more prone to inaccuracies in assigning patients to the four groups; much greater care was taken to validate assignments in the analysis of the survey data. On the other hand, the administrative records study has the advantage of a much greater sample size.

We explored the possibility that the difference in findings is related to the fact that the membership survey was restricted to adult residents of the three largest cities in the Rishon Lezion region. The analyses of the administrative records data were rerun, with the sample restricted to adult residents of those three cities.; the results of that analysis can be found in the last line of Table G-1. We found that restricting the analysis to adults in the three largest cities did not substantially alter the findings from the administrative records data set - the average level rose only slightly and the rankings of the four groups did not change. We concluded that this particular difference in study populations cannot account for the inconsistency between the two studies.

Differences with regard to the definition of "hospitalization" may account for part of the difference in the average hospitalization rate between the two data sources. The sick funds cover approximately 80% of hospitalizations in general hospitals, with the bulk of the remainder accounted for by the National Insurance Institute (deliveries), the Department of Defense (soldiers), and automobile insurance companies (victims of traffic accidents). Deliveries, and hospitalizations of soldiers and victims of traffic accident would be considered hospitalizations by survey respondents. The latter might also have included day treatments, and hospitalizations at psychiatric, rehabilitation, and geriatric hospitals.

In the end, the inconsistency is puzzling and disconcerting, but the case for basing the expenditure analysis on the administrative data, rather than the membership survey data, remains strong. First and foremost, only hospitalizations financed by KHC should be considered in the expenditure analysis. Second, the larger sample size produces more reliable estimates. Finally, the membership survey provides information only on whether the respondent was admitted over the past year, while we are interested in number of admissions.

Table G-1

Members Admitted Once or More (Percentages)

	N	Clinic Only	Clinic Dual	IP Only	IP Dual
Member Survey	~500	13.9	17.3	14.6	19.8
Administrative Records	~15,000	6.4	5.5	5.8	5.5
Administrative Records - adjusted (Urban adults)	~8,000	7.7	7.4	6.9	6.7

Table G-2

Major Differences Between the Two Studies

	Study A	**Study B**
Source	Administrative records	Member survey
Study population	KHC Rishon LeZion region All members	KHC Rishon LeZion region Adults in 3 cities
Sample size	~15,000	~500
Year	1987	1989/90
Which hospitalizations	Those covered by KHC	All
Dropout rate	0%	20%
Reliability issues	Up to 7% of admissions missing from Form 17 file	Memory/retention problems
Assignment of patients to the 4 groups	Less accurate	More accurate

•May include hospitalized and institutionalized persons

Incomes of KHC Members

The membership survey included a question on monthly family income. The findings (Table G-3) indicate that, as expected, IP members are more likely to have higher incomes than clinic members.

Moreover, when current IP members were asked whether they would switch to a competing sick fund if the IP program were discontinued, the frequency of "yes" responses rose with income level. These findings support the line of reasoning presented in this paper that it may be profitable for KHC to continue (and perhaps expand) the IP program even if it is more costly.

The membership survey also provided some information pertinent to decisions about targeting expansion at particular income groups. When members currently cared for in clinics were asked whether they would consider switching to the IP program, the frequency of "yes" responses was highest among those clinic members

with the higher incomes (Figure G-1). This suggests that, even without deliberate targeting on the part of KHC management, an expansion of the IP program would be disproportionately populated by upper-income persons.

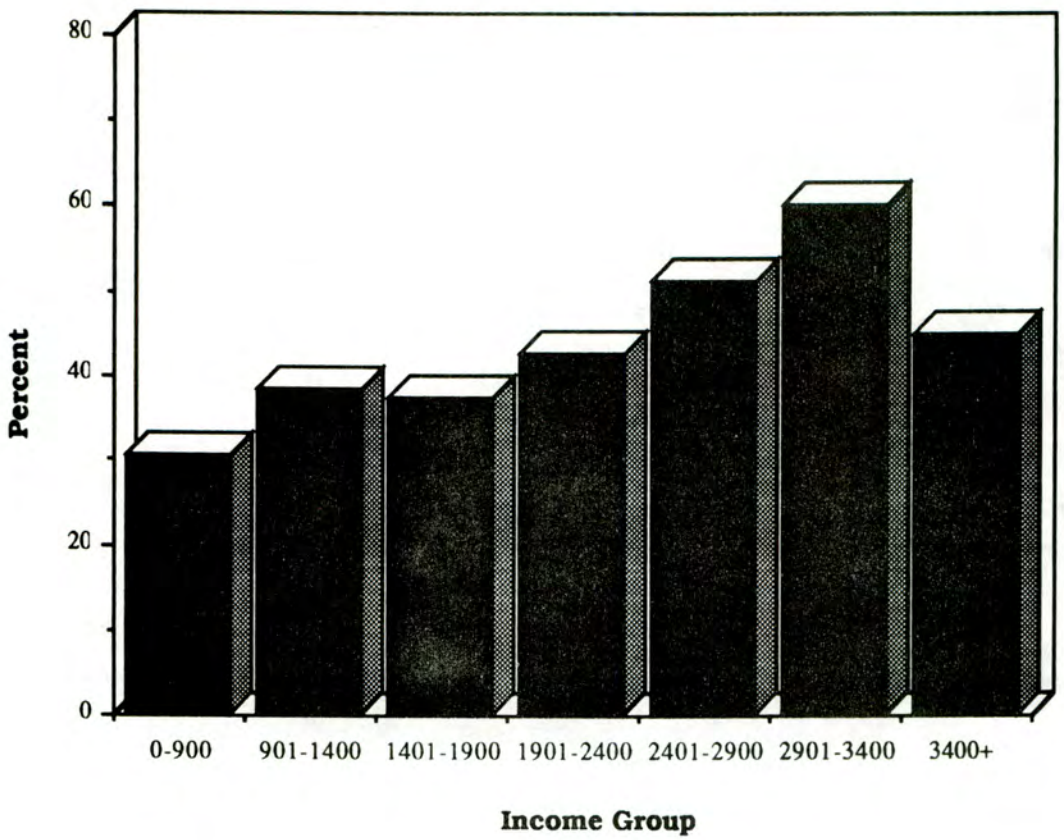
Table G-3

Distribution of Members by Income Group

MONTHLY INCOME (NIS)	CLINIC MEMBERS	IP MEMBERS
0-900	24.8%	9.2%
901-1400	22.6%	14.2%
1401-1900	14.7%	25.8%
1901-2400	17.4%	15.5%
2401-2900	8.5%	9.8%
2901-3400	5.4%	13.8%
3400+	6.6%	11.7%
TOTAL	100.0%	100.0%

Figure G-1

Percent of Clinic Members who Would Consider Switching to the IP Program (by Income Group).



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שיטת הרופא העצמאי ושיטת המרפאה הקהילתית בקופת חולים כללית: ההשפעה על הוצאות בריאות

ברוך רוזן ודן יובל

ג'וינט-מכון ברוקדייל

אורי גבאי וחדוה בראודה

קופת חולים כללית

ג'וינט — מכון ברוקדייל לגרונטולוגיה
והתפתחות אדם וחברה
גבעת־ג'וינט, ת.ד. 13087
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ירושלים 91034

דמ-29-92

מהו ג'וינט-מכון ברוקדייל?

מרכז ארצי לחקר הזקנה, מדיניות בריאות והתפתחות אדם וחברה בישראל.

מוסד עצמאי ללא כוונת רווח, הפועל בחסות ממשלת ישראל והג'וינט העולמי.

צוות מומחים המתמקד בזיהוי סוגיות נבחרות ונוקט גישה רב־תחומית לפתרון בעיות במערכות שירותי רווחה ובריאות.

נקודת מפגש לחוקרים, מעצבי מדיניות ואנשי מקצוע, המסייעים לקשור את ממצאי המחקר לביצועם של שינויים בשטח.

מרכז לשיתוף פעולה בין ישראל לקהילה הבינלאומית.

התכנית לחקר מדיניות בריאות בישראל

בתגובה למשבר המעמיק בשירותי הבריאות ולבקשת ממשלת ישראל, פיתח ג'וינט־מכון ברוקדייל בשיתוף ג'וינט ישראל תכנית לחקר מדיניות בריאות בישראל. מטרת התכנית היא לתרום למאמצים לשיפור מימון שירותי הבריאות והספקתם דרך ניתוחן של סוגיות מדיניות נבחרות. לתכנית שלושה יעדים עיקריים:

- לסייע לממשלת ישראל בתהליך התכנון, הביצוע וההערכה של רפורמות מרכזיות לשיפור ניהול מערכות בריאות.
- לסייע לספקי שירותי בריאות ולמבטחים בישראל במאמציהם לשפר את יעילותם ואת מועילותם.
- לפתח פרוייקטים מחקריים אשר נועדו לתרום תרומה לטווח ארוך למערכת שירותי הבריאות בישראל.

רשימת פרסומים נבחרים
של התכנית לחקר מדיניות בריאות

ע – פרסום בעברית

א – פרסום באנגלית

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שיטת הרופא העצמאי ושיטת המרפאה הקהילתית
בקופת חולים כללית:
ההשפעה על הוצאות בריאות

ברוך רוזן חן יובל
ג'וינט-מכון ברוקדייל

אורי גבאי וחדוה בראודה
קופת חולים כללית

אדר תשנ"ב ירושלים פברואר, 1992

מכון ברוקדייל: הספריה
את הספר יש להחזיר עד

תאריך	תאריך	תאריך

שם המחבר Rosen, B. ; Yuval, D.

שם הספר INDEPENDENT PHYSICIANS AND CLINIC PHYSICIANS IN KUPAT HOLIM...

שם השואל	תאריך	חתימה
מלכי אלון-נגיד	11.11.92	מל
אליו, שרון	25.11.92	אלף

תקציר

קופת חולים כללית היא הארגון להספקת שירותי רפואה הגדול ביותר בישראל ולה כשלושה מיליון וחצי חברים. כ-95% מחברי הקופה מקבלים טיפול ראשוני במרפאות קהילתיות, בעוד כ-5% מקבלים טיפול ראשוני במשרדו הפרטי של רופא עצמאי.

קופת חולים כללית מתמודדת היום עם החלטות מדיניות מרכזיות אחדות בנוגע לארגון העתידי של שירותי הרפואה הראשונית, כולל: האם להרחיב את שיטת הרופא העצמאי או האם לפתח דפוסים משולבים של שיטת הרופא העצמאי ושיטת המרפאה הקהילתית. המטרה העיקרית של עבודה זו היא לתרום לתהליך קבלת ההחלטות של הנהלת הקופה, באמצעות השוואה בין ההוצאות של שתי השיטות הללו לטיפול ראשוני. עבודה זו הינה חלק ממחקר רחב, הבוחן, בין היתר, את ההתפתחות ההיסטורית של שיטת הרופא העצמאי, וכן משווה את שתי השיטות מבחינת שביעות הרצון של הצרכנים וההשלכות על איכות הטיפול.

קופת חולים כללית מגבשת את תכניותיה לגבי הארגון העתידי של שירותי הרפואה הראשונית על רקע תחרות גוברת מצד קופות החולים הקטנות, הכבדת לחצי תקציב ועליית המונים. הקו המנחה את ההנהלה הבכירה של קופת חולים כללית הוא, כי הרחבת שיטת הרופא העצמאי עשויה אמנם להיות דרך יעילה ביותר לשיפור שביעות הרצון של הצרכן ולמשיכת חברים נוספים, אך היא יקרה מדי. חשש זה נובע מתוצאותיהם של כמה מחקרים פנימיים חלקיים, שבוצעו במהלך שני העשורים האחרונים. על כן, מחקר עומק מקיף, המשווה את עלות שיטת הרופא העצמאי לעלות שיטת המרפאה הקהילתית עשוי להשפיע רבות על מדיניות הרפואה הראשונית של קופת חולים כללית.

עבודה זו משווה הוצאות בריאות ב-1989 עבור מבוטחי שיטת המרפאה הקהילתית עם הוצאות הבריאות על מבוטחי שיטת הרופא העצמאי, במחוז ראשון לציון, אחד מכמה מחוזות שבהם שיטת הרופא העצמאי מפותחת. הניתוח מתמקד בארבעה מרכיבי ההוצאה הישירים של השירות, שיחד מהווים 80% מהוצאות קופות החולים: אשפוז, שירותי מרפאות חוץ, שירותי רפואה קהילתיים (כולל הוצאות על רופאים קהילתיים) ותרופות. תוקננו ההבדלים בין שתי הקבוצות על ידי הבאה בחשבון של מאפייני המבוטחים והרופאים. הניתוח מתבסס בעיקרו על נתונים מינהליים של קופת החולים, וקושר בין מספר מאגרי נתונים.

ניתוח הנתונים הגולמיים מצביע על שיעורי אשפוז נמוכים בקרב מבוטחים בשיטת הרופא העצמאי לעומת מבוטחים במרפאה הקהילתית, הן במונחים של קבלות לאשפוז והן במונחים של ימי אשפוז. כאשר מביאים בחשבון את מאפייני המבוטח והרופא, מתבטלים רוב ההבדלים בין שתי הקבוצות לגבי קבלות לאשפוז ומצטמצמים ההבדלים לגבי ימי האשפוז.

עלות הרפואה הקהילתית השנתית למטופל היא 102$ בשיטת הרופא העצמאי, ו-75$ בשיטת המרפאה – הבדל של 36% בין שתי השיטות. שיטת הרופא העצמאי אף יקרה במעט מאשר שיטת המרפאה הקהילתית בתחום מרפאות החוץ (53$ לעומת 46$) ובתרופות (38$ לעומת 31$). מצד שני, שיטת הרופא העצמאי זולה יותר בתחום האשפוז – 137$ לעומת 142$. כאשר מצרפים עלויות של רכישות ותקורה לארבעת מרכיבי ההוצאה האחרים, מתקבל סך כולל של הוצאה לבריאות עבור מטופל בשיטת הרופא העצמאי גבוה ב-10% בלבד מאשר הוצאות עבור מטופל בשיטת המרפאה הקהילתית – 401$ לעומת 366$. כדי לבטל את הפרש העלות של שירותי הרפואה הקהילתיים בין שתי השיטות (ולהקטין את הפרש העלות הכוללת לכדי רבע מגודלו הנוכחי) באמצעות הקטנת שיעור הקפיטציה המשולמת לרופא העצמאי – תידרש הקטנה של 44%.

שיטת הרופא העצמאי הינה יקרה מאשר שיטת המרפאה הקהילתית, אף כאשר אותם רופאים עובדים בשתי השיטות. כמעט מחצית מן הרופאים העובדים בשיטת הרופא העצמאי במחוז ראשון לציון עובדים גם במרפאות קהילתיות במחוז. סך כל העלות למטופל עבור מבוטחים שרופאיהם עובדים בשתי השיטות הוא 386$ בשיטת הרופא העצמאי ו-351$ בשיטת המרפאה הקהילתית. עלויות הטיפול הראשוני גבוהות במרפאות הרופא העצמאי במידה ניכרת, אבל השפעה זו נחלשת מעט בשל העובדה שרמות ההוצאות בתחומים אחרים – בעיקר שירותי אשפוז – שווים כמעט.

ממצאים אלה מבליטים את החשיבות שיש בבדיקה של סעיפי הוצאה נוספים, מלבד בדיקת עלויות הטיפול הראשוני, בבואנו לנתח את השפעת ההוצאות של תכניות לטיפול ראשוני שונות. היות שניתן לתלות את מרבית ההבדלים בהוצאות הטיפול הרפואי בסעיפים אשפוז ושירותי מרפאות חוץ, הבדלים אחוזיים קטנים יחסית בעלויות אשפוז עשויים לקזז הבדלים גדולים בעלויות הטיפול הראשוני. אפילו יהיו עלויות האישפוז שוות בשתי השיטות, הכללתם בניתוח עשויה למתן את השפעתם של ההבדלים בעלויות הטיפול הראשוני על הסך הכולל של ההוצאות **במונחים אחוזיים**.

למרות העובדה ששיטת הרופא העצמאי היא יקרה יותר מאשר שיטת המרפאה הקהילתית, ייתכן שכדאי יהיה לקופת חולים כללית להרחיב את השיטה. אם הרחבתה של השיטה תגביר את כוחה התחרותי של קופת חולים כללית, ותביא להגדלת מספר חבריה, הגידול בהוצאות יתקזז – ואף יותר מכך – באמצעות גידול בהכנסותיה. הרווחיות הסמונה בהרחבת השיטה תלויה הן ברמות ההכנסה של המצטרפים החדשים (משום שהן משפיעות על דמי החברות שלהם) והן במצב בריאותם (היות שהוא משפיע על שיעורי השימוש, ולפיכך על עלותם עבור קופת החולים). שינויים שנעשו לאחרונה בחוק מס מקביל החלישו, אך לא ביטלו, את הקשרים בין רמות ההכנסה של המבוטח, מצב בריאותו והרווחיות של קופת החולים.

מממצאי המחקר עולה, שמאפייני הרופאים והמדיניות לפיה נבחרים רופאים לשיטת הרופא העצמאי עשויים להשפיע על הוצאות בריאות. בהשוואה עם מבוטחים המטופלים בשיטת הרופא העצמאי, אשר רופאיהם מועסקים במרפאות הקהילתיות של קופ"ח כללית, מבוטחי שיטת הרופא העצמאי, אשר רופאיהם אינם עובדים במרפאות, היו קשורים עם ממוצע סך עלויות גבוה יותר –411$ לעומת 386$. הבדלים בעלויות עבור אשפוז ותרופות הם הגורמים המכריעים בהסברת ההבדל הכולל בין שתי התת-קבוצות. מרבית הרופאים העצמאיים, שאינם מועסקים במרפאות הקהילתיות, עובדים בעיקר כרופאי בתי-חולים, דבר העשוי להשפיע עליהם באימוץ דפוס טיפול יקר יותר. אף על פי כן, יש לפרש בזהירות את ההבדל בממוצע סך כל ההוצאות, שכן הפרש העלות עשוי להיות תלוי ביכולתם של הרופאים העובדים בשתי השיטות לבחור לעצמם את המטופלים הבריאים יותר, יותר מאשר ההבדלים בדפוסי הטיפול.

המחקר אף מדגיש שאפשר לבצע ניתוח בעל תקפות רבה יחסית ובעלות נמוכה של הוצאות אשפוז ומרפאות חוץ, תוך שימוש במקורות מידע קיימים. על הנהלת קופת חולים הכללית לא לזנוח את העובדה, שמערכות הנתונים הקיימות בתוך הקופה מהוות מקור אינפורמציה לתכנון ולהערכת תוכניות שלא נוצל עדיין במלואו.

הניתוח המוצג בעבודה זו נערך במהלך 1989; לגבי מרכיבי הוצאה אחדים הסתמך הניתוח על נתונים מלפני 1989. מאחר שמאפיינים כלכליים וארגוניים של מערכת הבריאות משתנים בהתמדה, ייתכן שיהיה על מקבלי החלטות לעדכן את ממצאי העבודה הזו כדי שישקפו התפתחויות אחרונות.

דברי תודה

ברצוננו להודות לאנשי המקצוע הרבים מקופת חולים כללית אשר איפשרו לנו גישה למאגרי נתונים ששימשו אותנו במחקר זה: אבישי גלי, יהודית וולף, בתיה וייצמן, נאוה ילין, נעים מאירי, אסתר מיק ושי עומר. בנוסף, ברצוננו להודות לחיים חקלאי ומאיר הנדלסמן ממשרד הבריאות, אשר סיפקו לנו נתונים על שימוש במרפאות חוץ של בית החולים אסף הרופא, ולרוקחים פיליפ סקס וקרול רוזנטל אשר פיענחו וקידדו את מרשמי התרופות.

ברצוננו להודות גם להנהלת מחוז ראשון לציון - עמנואל מרקו, דוד רוף ולזר מרום, ועדנה נתנזון - כולם תרמו לנו תרומה מקצועית חשובה וסייעו להסיר מכשולים מנהליים מן המחקר. תודתנו לנלו שביט שבזכותו התוודענו למחקרים קודמים בנושא, ואשר היה לנו תמיד מקור רעיונות רב ערך. תודתנו לנילי עדן, דוד רונן, אורי רבינוביץ, ורון שפיר על הצעותיהם החשובות בשלב תכנון המחקר.

תודה למילט ויינשטיין, פני פלדמן ונסי קיין (מהחוג למנהל ומדיניות הבריאות ב- Harvard School of Public Health) על תרומתם הנכבדה למחקר. תודה למרווין זלן (הרוורד) ולמשה נורדהיים (גיוינט - מכון ברוקדייל) על הייעוץ הסטטיסטי החיוני שסיפקו לנו בכל עת, וכן לאירה מוסקוביץ (אוניברסיטת מינסוטה), מוטי ליפשיץ (קופת חולים כללית), חיים פקטור, מיכאל רוזנבלוט ומרק כהן (גיוינט -מכון ברוקדייל) שתרמו בהערותיהם על נוסחים קודמים של המחקר. תרומה נוספת התקבלה בעת שהמחברים הציגו עבודה זו מעל בימות שונות, בהם סמינרים שנערכו מטעם אגף הכספים, האגף לתכנון ומידע, והחטיבה הרפואית של קופת חולים כללית, והנהלת קופת חולים כללית במחוז ראשון לציון.

כמו כן תודה למרים לוונברג ולאילנה קורצוויל אשר סייעו בעיבוד הנתונים ובתכנון המחקר, וכן לטרי בניגה, אשר ערכה את הדו"ח.

תוכן עניינים

רשימת לוחות

רשימת תרשימים