

University of Central Florida

STARS

Retrospective Theses and Dissertations

1988

Utilization of Ambulatory Services by the Health Maintenance Organization of Florida

Thomas Harold Hansen

University of Central Florida, thpausn@yahoo.com



Part of the [Medicine and Health Sciences Commons](#)

Find similar works at: <https://stars.library.ucf.edu/rtd>

University of Central Florida Libraries <http://library.ucf.edu>

This Masters Thesis (Open Access) is brought to you for free and open access by STARS. It has been accepted for inclusion in Retrospective Theses and Dissertations by an authorized administrator of STARS. For more information, please contact STARS@ucf.edu.

STARS Citation

Hansen, Thomas Harold, "Utilization of Ambulatory Services by the Health Maintenance Organization of Florida" (1988). *Retrospective Theses and Dissertations*. 4284.

<https://stars.library.ucf.edu/rtd/4284>

UTILIZATION OF AMBULATORY SERVICES BY
THE HEALTH MAINTENANCE ORGANIZATION
OF FLORIDA

BY

THOMAS HAROLD HANSEN
B.H.S., University of Florida, 1985

THESIS

Submitted in partial fulfillment of the requirements
for the Master of Science degree in Health Science
in the Graduate Studies Program
of the College of Health
University of Central Florida
Orlando, Florida

Spring Term
1988

ABSTRACT

The utilization of ambulatory services by the health maintenance organization of Florida (HMO), independent practice association (IPA) model, was compared to a fee-for-service population. Each randomly selected group consisted of 250 patients being cared for by the same providers, at the same clinic, during the calendar year 1986. Demographic and clinical data was gathered from the office charts. Frequencies were evaluated by the Statistical Package for the Social Sciences and t-tests were run to substantiate variance at the 0.05 level of confidence. The HMO group is a younger population ($t=0.017$), and the males are responsible for the increased utilization of ambulatory services ($t=0.001$). Trends of increased utilization are noted across the age groups and the variables. The rate of hospitalization is insignificantly higher for the HMO population and covers a broader range of age groups. Consequently, this HMO IPA model increases the rate of ambulatory service utilization in a younger population without reducing the rate of hospitalization. Cost effectiveness studies and organizational management evaluations are needed.

TABLE OF CONTENTS

Chapter

| | | |
|-----|--------------------------------------|----|
| I | INTRODUCTION..... | 1 |
| | Definition of a HMO..... | 2 |
| | Different HMO Models..... | 3 |
| | Logic of a HMO..... | 6 |
| | Founding of the HMO Concept..... | 7 |
| | Growth..... | 8 |
| | Evaluating Performance..... | 10 |
| | Economical Considerations..... | 12 |
| | Efficiency..... | 14 |
| | HMO Ambulatory Care Utilization..... | 15 |
| | Referrals..... | 20 |
| | Controlling Utilization..... | 20 |
| | Quality of Care..... | 23 |
| | Purpose and Rationale..... | 24 |
| II | PROCEDURES AND METHODOLOGY..... | 27 |
| III | RESULTS..... | 32 |
| | Entire Population..... | 32 |
| | FFS Population..... | 33 |
| | HMO Population..... | 34 |
| | FFS and HMO Comparison..... | 35 |
| | Male FFS and HMO Comparison..... | 36 |
| IV | CONCLUSION..... | 39 |
| | REFERENCES..... | 50 |

CHAPTER I

INTRODUCTION

Health-maintenance organizations (HMOs) are flourishing and it appears that they will be the base of all health care in the near future (Boland, cited in McDonald, 1987; Eastaugh, 1987; Luft, 1981; Taub, 1984). With the rising costs of health care, industry and the United States government are aggressively searching for ways to reduce expenditures while preserving quality of care. The initial studies presented to Congress in the early 1970s indicated that the rate of out-patient visits were similar between fee-for-service and HMO patients. The significant finding was that hospital admission rates were as much as 40% lower with HMOs (Gaus, cited in Luft, 1981; Luft, 1981).

Perkoff (1976) revealed that present-day HMO patients may actually be over-utilizing ambulatory services, and hospitalization rates are not significantly different or not low enough to reduce the overall cost of health care. In Luft's (1981) extensive six year review of HMOs, a consistent point was made in that "a larger proportion of HMO enrollees have at least one visit per year than is the case for nonenrollees" (p. 137). When the HMOs were broken down into different types, "enrollees in six out of seven

independent practice associations had more visits than the comparison populations" (Luft, 1981, p. 137).

As the HMO concept becomes a larger part of our health care system, the scientific community needs to clarify the continued efficacy of pre-paid outpatient medicine. In order to contribute to this need, this study will identify the utilization rate of ambulatory services by patients enrolled in an independent practice association model of a HMO. They will be compared to FFS patients and the health care will be rendered by the same providers, whom are not employed by the insurers.

The hypothesis considered for this study is that the over utilization of ambulatory services by the HMO patients will not be compensated for by a statistically significant reduction in the rate of hospitalizations. Therefore, in this particular setting, the independent practice association (IPA) model of a HMO is not providing cost-effective health care.

Definition of a HMO

Today's prevailing health care issues and policy decisions are focused on accelerating expenditures. Health maintenance organizations appear to be a solution. The HMO concept not only provides the avenue to reduce the cost of health care delivery but also has potential to increase access, especially to the poor (Luft, 1981). In contrast

to the traditional fee-for-service system, as traditionally defined:

HMOs are prepaid health plans that provide health maintenance, diagnostic and treatment services, including hospitalization, for a fixed fee. HMOs cover services that indemnity plans such as Blue Cross Blue Shield, Aetna and Prudential do not: checkups, childbirth, and routine baby care. To avoid unnecessary care and to stress prevention, physicians and HMOs are given incentives such as bonuses for reducing referral to other specialists and hospitalizations. (Taub, 1984, p.16)

Different HMO Models

HMOs encompass four models of pre-paid health care organizations: staff, medical group, independent practice associations (IPAs), and networks. The staff model HMOs employ physicians and provide them with a salary. The group model HMOs form a group practice that contracts with management and the insurance company. The income is pooled and redistributed using a detailed formula. Inside this model there is the dual group model which contracts with a non-HMO corporation to obtain provider services and the single-entity group model in which the physician group constructs its own HMO, health plan, and insurance entity

as separate product lines, with a budget incorporated as part of the medical group (Estaugh, 1987).

The independent practice association (IPA) is a legal entity of its own and the HMO contracts with the providers in their existing facilities. The two variations includes one (the oldest) that contracts with a non-HMO entity for services on a fee-for-service basis. The second variation of an IPA is one that organizes and implements a separate HMO. Providers receive a monthly capitation per age group. The patient may also be required to pay a co-payment at the time of each visit. This ranges from zero to \$10.00. Emergency room visits are \$25.00 to \$50.00 dollars. This second variation, which this study will concentrate on, is popular because it is federally qualified. Both variations are organized with a "hold-back-risk-pool provision where 10 to 35 percent of charges are held in the pool to be redistributed at the end of the year if the utilization experience has been sufficiently constrained" (Estaugh, 1987, p. 153). A marketing tool for the IPA is often the presence of successful staff model HMOs in the community and are created from medical societies at the county or state level (Estaugh, 1987).

The fourth model is the network plan. In this incidence, "Blue Cross/Blue Shield, five for-profit hospital chains, and two nonprofit co-ops or alliances have developed network HMO models to compete with smaller local

HMOs for prepaid business" (Estaugh, 1987, p. 153). The model is franchised out to cover a specific region such as a city or a state. This model is very attractive to multistate employers (Estaugh, 1987).

Ellwood (cited in Luft, 1981) provides a generic description of an HMO which is listed below.

1. The HMO assumes a contractual responsibility to provide or assure the delivery of a stated range of health services. This includes at least ambulatory care and inpatient hospital services.
2. The HMO serves a population defined by enrollment in the plan.
3. Subscriber enrollment is voluntary.
4. The consumer pays a fixed annual or monthly payment that is independent of the use of services. (This does not exclude the possibility for some minor charges related to utilization.)
5. The HMO assumes at least part of the financial risk or gain in the provision of services.

Federal legislation defines a HMO more stringently and provides more precise wording (U.S. Department of Health, Education and Welfare, 1979, cited in Luft, 1981). Lists of services are defined as outpatient care, inpatient care, alcoholism treatment, psychological services, dental services, home care, etc. Many HMOs do not offer the

services and therefore are not federally certified. Wetherille and Quale (cited in Luft, 1981) revealed that 24 percent of existing HMOs met minimal requirements as outlined by the HMO Act of 1973. In 1976, an amendment (P.L. 94-460) eased restrictions, but a few established HMOs still did not seek federal certification. The detailed definition of the HMO Act of 1973 is beyond the scope of this paper.

Logic of a HMO

The logic of the HMO concept has been supported by "numerous reports of HMOs serving large populations with half the number of hospital beds and patient days as are used by age-sex matched populations with conventional insurance and fee-for-service providers" (Luft, 1981, p. vii). The federal government has supported HMOs with legislation that not only promotes but encourages the concept's expansion. If an HMO (federally certified) is in the area, the employer is obligated to offer the plan to the employees (Eastaugh, 1987). Taub (1984) further cites varied reasons why the HMO concept will succeed with the major factor being health care cost containment.

Regardless of his findings, Luft (1981) still emphasizes that when evaluating HMOs, caution should be exercised. He points out that "HMO policy is based on discussions that contain more rhetoric than evidence and

HMOs differ greatly, even when similarly organized" (p. viii).

The theoretical implications are significant if one considers that many new pre-paid health insurers are entering the market and physicians across the country are signing contracts to supplement their practices with a percentage of pre-paid patients. Even though Luft's (1981) book lists references for 44 pages that support the equity, excellence, and efficiency of the HMO system, the vast majority of the studies have dealt with inpatient services. Thus, the new and rapid changes of outpatient care in the different models of HMOs have not been adequately studied.

The results of existing studies are unable to be directly correlated with a combined setting where fee-for-service and pre-paid patients are cared for. These correlations become even more skewed when the providers are not directly employed by the insurers. Furthermore it has been illustrated that pre-paid and fee-for-service physicians practice different styles of medicine (Manning et al., 1984).

Founding of the HMO Concept

In 1929, the Ross-Loos Health Plan was formed and provided health care for the Los Angeles Water Department employees. During the 1940s, Kaiser Industries organized

the Kaiser-Permanente Medical Care Program. This non-profit plan remains the largest in the United States. By the early 1970s, the federal government took interest and the concept began to flourish. Politicians viewed the health maintenance impression of the term health maintenance organization as far more positive than medical care or sickness care, and thus the new term was created. Former President Nixon, in 1971, needed this new positive term to promote his comprehensive health policy for the 70s. The industry was legitimized when the HMO Act of 1973 was passed by Congress (Taub, 1984). Since then, the federal government has required dual choice under section 1310 (P.L. 93-222). This requires an employer to include one or more federally qualified HMOs to the employee benefit program (Eastaugh, 1987).

Growth

Former President Nixon, in 1980, predicted that HMO enrollees would total 40 million. In 1981, the total was 10 million and in 1986, 23.3 million or 9.4 percent of the U.S. population which consisted of 3.2 million with staff HMOs, 6.7 million with group HMOs, 8.0 million with IPAs, and 5.4 million with network HMOs. According to National HMO Census data from the office of Health Maintenance Organizations - Public Health Service, the prediction for 1988 is 28-41 million or 11-16 percent of the population.

By 1990, 34-64 million or 13-25 percent is predicted (Eastaugh, 1987).

HMOs have increased their coverage of the rural communities. In 1980, 4 percent of counties with 10,000 residents or less had HMOs. By 1986 this had risen to 15 percent. Eleven percent of counties with populations of 10,000-49,999 had HMOs in 1980 and this rose to 25 percent in 1986. "Virtually 100 percent of urban communities had one or more HMOs by 1985" (Eastaugh, 1987, p. 156).

The rapid expansion of alternative health care delivery systems is expected to continue, and it is predicted to account for 70 percent of the population by 1990. Another 25 percent will receive care in a managed fee-for-service setting and only 5 percent will remain in the traditional fee-for-service setting. Furthermore, a "triple option of indemnity insurance, a Preferred Physician Organization (PPO), and an HMO will all be offered by each health care organization" (Boland, cited in McDonald, 1987, p. 56).

In 1983, the for-profit HMOs went public when U.S. Health Care Systems converted over from a non-profit company. While the HMO industry is predicted to grow at 22 to 25 percent, the for-profit sector is predicted to grow at 30 to 40 percent annually. By 1990, they should control 20 to 30 percent of the overall revenues (Taub, 1984).

Schesinger et al. (cited in Eastaugh, 1987) points out that the costs of a for-profit HMO is 10 percent greater than a non-profit HMO, and this is secondary to the increased costs of ambulatory care. Strategies to reduce this margin include utilization review and co-payments. Welch (cited in Eastaugh, 1987) reported that the "demand for HMO enrollment is a negative function of the co-payment charged by the HMO for an office visits. Therefore, co-payments may be in proportion to how well established the organization is and how many new enrollees are needed" (p. 165).

Until recently, HMOs in Florida were in a cannot loose market. Competition had resulted in the number of HMOs increasing from 15 to 46 in three years until a recent market shakedown reduced this number to 40. Regardless, in December of 1987, more than one million Floridians paid \$1.1 billion in gross premiums to these 40 different HMOs. The shakedown is expected to continue as the larger companies merge or take over the smaller ones. As a safegaurd, Florida "requires that the net worth of an HMO be the larger of two numbers, either \$100,000.00 or 5 percent of total liabilities" (Trimarchi, 1987, p. 20).

Evaluating Performance

Evaluating the performance of HMOs has mostly been done by observational studies comparing the enrollees of

different plans and were cared for by their respective private physician or HMO employed physician (Epstein, 1986; Luft, 1981; Manning et al., 1984; Perkoff, 1976). Since the subject chooses which plan to participate in, age-sex health status adjustments are less than optimal. To compound this variable, physicians may choose to be HMO providers because of a preference for low utilization of resources. According to Luft (1981), "Both selection cases involve serious methodological issues, because if HMOs differentially attract or retain people who are naturally inclined to be low utilizers of care, then not only are the HMO rates artificially depressed, but the rates for the comparison group are artificially inflated" (p. 383).

Manning et al. (1984) also raised the question of whether "those choosing an HMO were healthier" (p. 1505). If so, that could account for the reduced hospitalization rate. One major study has been done to assess the income elasticity of HMO enrollees. Welch and Frank (cited in Eastaugh, 1987), using the national data set, report a $-.64$ income elasticity of HMO enrollment and suggest that families of modest means are a natural clientele of HMOs. They also found that families with lower reported health status are less likely to enroll in HMOs. One may never ascertain from retrospective analysis whether this is the result of favorable selection (by the HMO of the healthy), weak marketing of the HMO in areas with a sicker clientele,

or simply a variant of natural selection. For example, sicker people may desire to remain with their current FFS provider (Eastaugh, 1987).

A 1986 General Accounting Office study cited data from 27 HMOs and revealed only 74 percent of the predicted mortality in Medicare enrollees. In addition, fewer low-income patients were enrolled when compared to the local Medicare population. When an organization inadvertently attracts healthier enrollees, it is called favorable selection. If deliberate action is taken, it is called skimming (Eastaugh, 1987).

To compound the variables even more, each HMO has its own unique features. For this reason, performance cannot clearly be contributed to the general concept nor to the special features. The size of the organization is also a distinct variable. While the Kaiser-Permanente program has 3.5 million members that cover six regions, the Medical Care Group of Washington University, has only 500 families (Luft, 1981).

Economical Considerations

Even though regulations and policies are established with the financial incentives in mind, there is little scientific data to support the actual effects. More data is needed concerning the effects of physician selection, practice group size, peer pressure, organizational goals,

consumer involvement, administrative structure, and referral patterns. Luft (1981) pointed out "that economies of scale in providing ambulatory visits do exist, but they are achieved by relatively small groups of about three to five physicians, and that diseconomies of scale may predominate in larger groups" (p. 390). Furthermore, "little is known about the competitive influence of HMOs on conventional providers. It may, in fact, be the most important aspect of HMO performance, yet the evidence is far from conclusive" (p. 385).

It has been shown that the providers are not fully aware of the economic factors involved in their clinical decisions. Nagurney (1979) was consistent with the few previous studies and further revealed that:

81% of the house staff and all of the attendings at a teaching hospital correctly estimated the daily semi-private room rate, but only 15% of each group correctly estimated the charge for a serum potassium. Roughly half of the questions concerning various third-party benefit plans were answered correctly. Over 50% of all surveyed correctly estimated the charge for the brain CT but were much less accurate in their estimates for more commonly ordered tests. (p. 727)

Nagurney (1979) finds the above data significant in that our crisis with health care costs is largely determined by the daily clinical decisions of the average physician. To compound these factors, physicians vary in their cost generation (Donabedian, Ofleinik, cited in Nagurney, 1979) while FFS and HMO providers practice diverse styles of medicine (Luft, 1981).

Efficiency

The "generic HMO" has three primary advantages in its ability to produce efficient medical services. First, the HMO has more knowledge about the population that it serves. Secondly, the HMO has the ability to strategically plan staffing and facilities to serve this population. Thirdly, financial incentives exist to reduce excessive utilization. These advantages do not exist in all cases. For example, the degree of control over the hospitals that an HMO utilizes will directly effect the efficiency of inpatient services. In addition, the efficiency is effected by the organization of ambulatory services (small group, solo, large group, etc.). The foundation of the competition among health care organizations is to maintain pressure on the providers and the insurance companies so health care is provided at lower costs (Traske & Milenson, cited in Eastaugh, 1987). McNerney (cited in Eastaugh, 1987) sums up the purpose of competitive health care

systems: "The ultimate purpose of pro-competitive proposals is to motivate doctors, hospitals, and other providers to compete with each other to offer health care in less costly ways. There is merit in this theory" (p. 148).

The heightened competition and the drive for increased efficiency of the health care delivery system has resulted in detailed assessment of technology, health service organizations and, the basic promotion of cost containment without any concern for the various sequelae. As a result, resource allocation of health care dollars will become progressively constrained. Basically, health care costs cannot continue to grow faster than our economy (Saward, cited in Eastaugh, 1987). Even though no one specific health plan offers relief from the inflationary health care costs, supporters of competition caution society and the federal government against a more regulatory approach (Eastaugh, 1987).

HMO Ambulatory Care Utilization

By offering nearly complete or complete coverage, HMOs encourage the use of ambulatory care. This, in effect, removes the financial barriers to access. In contrast, they also provide countering incentives for the provider to discourage all unnecessary ambulatory and inpatient care. The increased coverage and outpatient

care predictably result in an increase in visit rates and a lower overall cost secondary to economizing. Luft's (1981) research reveals evidence, although fragmentary, that support these conflicting incentives. A consistent point is made in that "a larger proportion of HMO enrollees have at least one visit per year than is the case for nonenrollees. Data for matched groups with the same ambulatory coverage (such as Medicaid enrollees) suggest that it is largely the result of the differential coverage" (p. 137). Luft (1981) goes on to reveal that when the HMOs are broken down into different types, "enrollees in six of seven IPAs had more visits than the comparison populations. While prepaid group plan enrollees had about the same chance of having more or fewer visits as their control populations" (p. 137). An important point is brought out when the degree of third party coverage is accounted for. Luft (1981) stated that the HMO enrollees could utilize less services than other enrollees with complete third party coverage who are being seen by FFS providers.

The predicting of the theoretical relative rate of utilization is difficult and empirical testing is laden with problems. Interview data would be more reliable over insurance or company records but, visits are easily forgotten by patients (U.S. National Center for Health Statistics series 2, no. 7, no. 45, no. 49, cited in Luft,

1981). Data is further distorted by the multiple definitions of an ambulatory visit. For example, patients visit the office to see the physician, to get lab work or other services performed and often go to other buildings. Which one or which combinations should be counted? Should follow-up visits for laboratory review be counted? The data concerning the utilization of ambulatory services is found to be subject to error and must be analyzed with care (Luft, 1981).

Control over visits is also a major factor to be considered. The control of initial or preventive visits lie with the patient while the control of follow-up visits is with the provider. The HMO provider receives incentives to reduce follow-up visits while the FFS provider is benefited by offering more. Can HMOs be effective in reducing this number of high utilizers? This is of great value considering that a small proportion of our population utilizes a large proportion of services (Densen et al., cited in Luft, 1981). Luft's (1981) analysis was only able to weakly support this concept, and the apparent decreased proportion of patients with many visits was accompanied by a decreased proportion of patients that were never seen. Stronger data exists to support the concept that "when HMO coverage is much better than conventional coverage, ambulatory use is higher: when

coverages are comparable, HMO enrollees are as likely to use fewer services as they are to use more" (Luft, 1981, p. 137).

The extensive data reviewed by Luft (1981) clearly reveals that HMO enrollees utilize ambulatory visits more than control groups. There is also a minority of scattered data that contradicts these findings (Luft, 1981; Scitovsky, cited in Taub, 1984). The national data used for comparison indicated that during FFS visits, laboratory work is ordered in 20 percent of visits, x-rays are ordered in 7 percent, immunizations or injections are given during 19 percent, and 2.7 percent resulted in a referral to another physician (Luft, 1981). Strikingly enough, the United States utilized 25 percent of its ambulatory health care expenditures on radiography and laboratory tests (Scitovsky, cited in Taub, 1984). Furthermore, due to the concentration of previous research on hospital related care, the ambulatory care issue has not been thoroughly studied (Gaus, cited by Manning et al., 1984; Luft, 1981).

The Department of Health and Human Services (cited in Luft, 1981) documented that specific segments of our population utilize ambulatory visits more than others. Females (even after excluding pre- and post-natal visits) (Perkoff, 1976), individuals 65 and older, and urban dwellers visited the physician more often than males,

younger individuals and residents of rural areas.

The data also suggests that the variety of services used during HMO ambulatory visits is not statistically different from FFS visits. However, Luft (1981) found strong evidence revealing that "HMOs offer much better coverage for preventive services and had much higher utilization rates for its enrollees than the average conventional plan" (p. 393).

All researchers have cautioned that HMO and FFS comparisons have never been, and never will be clearcut. Multiple factors contribute to varied ordering practices. For example, fewer tests may be ordered for patients with less insurance coverage and providers of prepaid medicine may have different approaches to preventive medicine and outpatient care. Even more relevant is whether providers have started ordering more tests to increase the quality of care or to decrease the likelihood of malpractice.

As previously mentioned, larger FFS groups have been found to order more ambulatory tests (Luft, 1981). This difference in physician ordering is highlighted by the conclusions of Epstein et al. (1986), which revealed that internists at a large HMO practice ordered 40 percent less chest radiographs and 50 percent less electrocardiograms than internists at a large FFS practice. Epstein et al. (1983, cited in Eastaugh 1987) had also documented that

larger practices ordered as much as 50 percent more ambulatory tests than did smaller practices.

Referrals

In theory, a HMO can reduce referrals by utilizing incentives (Ermann, cited in Eastaugh, 1987). One example of this is the physician as a gatekeeper. This places the provider at financial risk for the referral because the cost comes out of a bonus fund, that would be partly reimbursable at the end of each year. Staff model HMO providers are salaried and therefore do not have this financial incentive, but company policy may be effective. The degree of staffing and patients seen per day may also effect a providers ability to be an effective gatekeeper. The patient's expectations of needing a specialist are also a prevailing factor (Eastaugh, 1987). Lufts (1981) national data for comparison indicated that 2.7 percent of office visits resulted in a referral to another physician. Perkoff's (1976) study revealed one primary HMO referral at each 8.8 visits or, 11.4 percent of office visits.

Controlling Utilization

A HMO can control inpatient utilization in one or more of the following manners: (a) physician behavior can be restrained, (b) incentives for the physician, (c) incentives for the patient, and (d) choose physicians by their styles of practice (Eastaugh, 1987). Homer (cited

in Eastaugh, 1987) in a survey of 93 HMOs reported the following controls:

1. Seventy-three percent require prior approval of elective admissions.
2. Newer HMOs are more likely to utilize annual bonus schemes for physicians.
3. Smaller HMOs are more likely to use one type of bonus ambulatory care incentive payments for physicians.
4. Independent Practice Associations (IPAs) are less able to select physicians who order less inpatient services and admissions (conservative practice style) for the plan because participation is nonexclusive (open to any medical society member in most cases).
5. IPAs are less able to confine treatment to ambulatory care facilities because they do not directly operate such facilities.

Many have suggested that an effective method of reducing health care costs would be to utilize pre-paid group practice to control hospital admissions and lengths of stays. The HMO concept was created from these suggestions and the increased utilization of ambulatory services to replace expensive hospital utilization was predicted to result. Preventive care was also predicted to reduce overall costs. The evidence to support these claims

is favorable (Department of Research, Kaiser Foundation, Medical Care, MacColl, Perott & Chase, Peterson, Roemer, Seward, Sapiro et al., cited in Perkoff, 1976). Perott (cited in Luft, 1981) offered data to support a decrease in hospitalization; others showed decreased costs in large prepaid group practices (Kaiser Foundation, Newman, cited in Luft, 1981), and additional cost advantages were also cited (Donabedian, Roemer, cited in Luft, 1981).

More recently, Mott (cited in Eastaugh, 1987) documented 15 ways that a HMO enrollee could be hospitalized and the HMO would either be unaware or would not report the admission. This out-of-plan utilization is difficult to adjust for but may represent five to 20 percent of admissions. A noted three to four percent decline in hospitalizations between 1983 and 1986 may be due to either HMO efficiency, competition, or this out-of-plan utilization.

In sharp contrast is the prevalent theory that our present FFS fee schedules promote overutilization of technically advanced services over basic primary care for which generous reimbursement exists (Epstein et al., 1986). No consistent overutilization of ambulatory testing in the FFS population has been reported (Diehr, Eisenberg et al., Hastings, Manning et al., Perkoff et al., Scitovsky, cited in Epstein, 1986), although Epstein et

al. (1986) did show an increase usage of electrocardiograms and chest roentgenography in a large FFS practice.

Quality of Care

The quality of care is measured in reference to health outcomes and is found to be comparable for non-HMO and HMO patients (Brook et al., cited in McDonald & Wilke, 1987). In addition to sound clinical care, quality care includes timely access, the patients satisfaction, the production, and the efficiency of the health care (Donabedian, cited in McDonald & Wilke, 1987). All of which are difficult to measure (McDonald & Wilke, 1987). The effects on quality are summed by Chassin et al. (cited in Eastaugh, 1987): "We do not yet know whether prepaid or prospective payment has had negative effects on quality. We have some anecdotal reports, but they could represent the tip of an iceberg or an ice cube floating on the surface of the ocean" (p. 148).

After a half decade of cutting costs, allegations concerning diminished quality of care have become prominent. Many are centered around cost cutting interfering with diagnosis, early discharges from hospitals, and deliberate obstacles to prevent access to services. The result has been the formation of systematic computerized performance evaluations of institutions and physicians. Medicare utilizes a peer review organization

that evaluates and penalizes physicians if needed. The federal government has also begun to evaluate the quality of HMO ambulatory services (Scheier, 1988).

From an economical point of view, Ware et al. (cited in Eastaugh, 1987) suggests the HMO concept will erode the health of the poor over time. At the end of his study, the HMO sick poor appeared worse off than both the free care and the cost-sharing patients who were treated by traditional FFS providers. He goes on to state that the reason may be that HMO patients must take more responsibility for compliance and the providers are less aggressive or paternalistic than FFS providers. Regardless, no research has concluded that HMOs medically cheat patients. Even if the predicted glut of physicians attracts better providers for the HMOs, the question still remains whether the need to control costs will obscure the quality of care (Taub, 1984).

Purpose and Rationale

In order to represent the growing number of IPAs it was crucial that both study populations receive health care by the same providers. This data will be more specific because much of the existing HMO data is derived from other HMO models where the HMO patients are seen by a HMO employed provider and the FFS patients are seen by a private practice provider (Epstein, 1986; Luft, 1981;

Manning et al., 1984; Perkoff, 1976). This characteristic will also reduce the significance placed on variation due to the different styles of practice between HMO and FFS providers (Manning et al., 1984).

The available HMO data largely represents hospitalizations and in-patient services (Luft, 1981). This study will go one step further and provide needed information in the field of out-patient care. The findings will be significant in that the use of radiography and laboratory tests account for roughly 25 percent of ambulatory-care expenditures (Scitovsky, cited in Epstein et al., 1986).

As previously mentioned, the population selection, for HMO and FFS comparisons, has inherent variables which may never be isolated for proper analysis. For example, the health of the HMO population may be better at enrollment (Manning et al., 1984). Others have supported this view (Eastaugh, 1987; Welch and Frank, cited in Eastaugh, 1987). This study was able to randomly select the populations for comparison from a large mixed pool of HMO and FFS patients that chose the same group of health care providers. In theory, each individual patient chose the kind of health care insurance and the providers from whom to receive health care. This is felt to be the best possible representation of the average patient and the community.

The resultant data are expected to reveal higher utilization rates of ambulatory services among HMO enrollees. Hospitalization rates are predicted to be equivalent. Females and individuals over 65 are expected to have higher utilization rates regardless of the method of payment. The overall cost of the health care delivered will not be able to be determined, but the pattern of utilization will support my hypothesis: The higher utilization rate of ambulatory services by the HMO of Florida patients is not compensated for by a statistically significant reduction in their rate of hospitalization.

CHAPTER II

PROCEDURES AND METHODOLOGY

Patients utilizing the health maintenance organization, HMO of Florida, were compared to fee for service (FFS) patients being treated at the same primary care office. In addition to having a large FFS population, the clinic had been classified as a HMO of Florida Individual Practice Association (IPA) since 1984. The form of reimbursement is capitation payment with 20 percent holdback and a \$2.00 patient co-payment for each visit. A FFS patient was identified as an individual who pays customary charges at the time of each visit. This population included Medicare because the clinic did not accept assignment.

This single practice setting was chosen for two major reasons. First, the providers needed to consistently and simultaneously provide care to a significant number of HMO and FFS patients while not being directly employed by the HMO organization. Secondly, the time and funding allotted for this research did not allow the formation of a control group, or the identification of other similar clinics, which could be identified and analyzed.

The family practice office is located in a northern suburb of Orlando, Florida. The population is derived from three counties totaling approximately 950,000. Although the practice tries to utilize one hospital, there are six in the area, two of which are large teaching hospitals. There are also numerous walk-in medical clinics. At the end of 1986, the practice contracted with 10 of the 45 HMOs in the state of Florida. The clinic staff of two male physicians and two female physician assistants (PAs) provided care for both groups of patients. One physician has 20 years of experience, eight as a psychiatrist and 12 years at this family practice clinic. He had no active psychiatric practice while at the clinic. The second physician has 19 years of family practice experience, five with the military and 14 years at this clinic. The PAs have one and three years experience each and administer care under the direct and indirect supervision of the physicians. All providers see their own scheduled patients, and the ordering of tests by PAs may or may not be influenced by physician consultation. The utilization of PAs does not hinder the validity of the data. HMOs promote the usage of PAs and Luft (1981) found no significant difference in the HMO or the FFS groups usage of allied health personnel. The competence and cost effectiveness of the physician

assistant has already been well documented (Johnson & Freeborn, cited in McDonald, 1987; Manbar, 1985).

In order to select a statistical sample of the HMO and FFS populations, 250 out-patient records from each group were randomly selected. HMO of Florida computer records were used to identify patients who were assigned to this clinic for the period January 1, 1986 to December 31, 1986, and who made one or more visits during that year. Of the 2,599 listed, 1,128 were eligible. Every seventh was selected to provide 250 subjects. If the chart was not found, the adjacent name was chosen starting below and then above if needed.

No computerized record existed to identify the fee-for-service patients. Therefore, to identify this subject group, the total number of fee-for-service charts in the files was estimated to be 13,000 (total number of charts minus number of all HMO and other pre-paid participants). To provide 250 subjects, every 52nd chart was reviewed. If they received care and had not participated in a pre-paid health plan within the time period, they were chosen for the fee-for-service group. If the chart did not meet this criteria, the next chart in file was reviewed.

The outpatient records were abstracted to obtain clinical and demographic data. The demographic data included age, sex, and marital status. The charts did not contain consistent information concerning race or income,

so these characteristics were not used for analysis. The clinical data included the number of visits with the providers, the number of non-provider visits, and the number of different diagnoses. The number of immunizations, hospitalizations, and in-patient surgeries was also recorded.

The number of the following laboratory tests were recorded: complete blood count, chemistry profile, urinalysis, urine culture, Papanicolaou smear, throat culture and all others were categorized as other lab. The number of electrocardiograms performed was also recorded. The category office procedures included: incision and drainage, pulmonary function tests, graded exercise testing, and lesion removals. Roentgenography included: long bones, barium swallows and enemas, and echography. Special roentgenography included: mammography, computed tomography, nuclear magnetic resonance, pyelography, and radionuclide scanning.

The Statistical Package for the Social Sciences was utilized to identify variance and analyze the data. In order to identify significant frequencies at a 0.05 level of confidence, the T-test was then run. The full year of data collection avoided bias by any seasonal changes which would effect any shorter period of time. The randomization process provided a true primary care population and displayed an equal distribution of age and

sex. The previously hypothesized difference in HMO and fee-for-service physician practicing characteristics is not a significant factor here because the same providers saw both groups in the same setting (Manning et al., 1984). One should always take into consideration that, in this study and all studies reviewed, the patient and the provider were always aware of who paid the bill.

CHAPTER III

RESULTS

The HMO group was found to be significantly younger, and the HMO males were identified as the cause of an increased utilization of ambulatory services. Isolation of laboratory services and further breakdown of the other ambulatory services did not reveal any statistically significant differences. Also, no differences in the rate of hospitalizations were noted.

Entire Population

The data analyzed consisted of 500 valid cases (250 FFS and 250 HMO). There were 264 (52.8%) females and 236 (47.2%) males. There was no statistically significant difference in the male mean age of 37 and the female mean age of 36 ($t=0.558$). Marital status was represented by 180 (36%) single, 300 (60%) married, 12 (2.4%) widowed, and 8 (1.6%) divorced. Of the 264 females, there were 53 (20%) under 21 years of age, 180 (68.2%) between 21 and 60 years of age, and 31 (11.7%) were above 60 years of age. Of the 236 males, there were 54 (10.8%) under 21 years of age, 153 (64.8%) between 21 and 60 years of age, and 29 (12.3%) were over 60 years of age.

The utilization of ambulatory services totaled 3,149 with 1,324 (42%) being laboratory. The females utilized 1,679 (53.3%) services with 701 (41.8%) being laboratory. The males utilized 1,471 (46.7%) services, with 623 (42.4%) being laboratory. There were no statistically significant differences noted in the utilization of ambulatory services between the males and females ($t=0.778$). There were also no differences in the utilization of laboratory services ($t=0.355$). The under 20 age group utilized 564 (17.9%) of the ambulatory services, 198 (15.0%) being lab. The 21 to 60 age group utilized 2,042 (64.8%) services with 881 (66.5%) being lab. The over 60 age group utilized 543 (17.2%) services, 245 (18.5%) being lab. The rate of hospitalizations was not statistically different between the males ($n=30$) and the females ($n=24$), ($t=0.382$).

FFS Population

The FFS group analyzed consisted of 250 valid cases. There were 140 (56%) females and 110 (44%) males. There was no significant difference in the ages of the males ($m=40$) and the females ($m=41$), ($t=0.728$). Marital status was represented by 85 (34%) single, 151 (60.4%) married, 10 (4%) widowed, and 4 (1.6%) divorced. Of the 140 females, there were 21 (15%) under 21 years of age, 92 (65.7%) between 21 and 60 years of age, and 27 (19.3%) were above 60 years of age. Of the 110 FFS males, there were 21

(19.1%) under 21 years of age, 65 (59.1%) between 21 and 60 years of age, and 24 (21.8%) were over 60 years of age.

The FFS utilization of ambulatory services totaled 1,401 with 580 (41.4%) being laboratory. The females utilized 823 (58.7%) services with 343 (41.7%) being laboratory. The males utilized 578 (41.3%) services, with 237 (41.0%) being laboratory. The FFS under 20 age group utilized 176 (12.5%) of the ambulatory services, 62 (10.7%) being laboratory. The 21 to 60 age group utilized 803 (57.3%) services with 333 (57.4%) being laboratory. The over 60 age group utilized 422 (30.1%) services, 185 (31.9%) being laboratory. There were no differences in the hospitalization rates between the males ($n=12$) and the females ($n=9$), ($t=0.693$).

HMO Population

The HMO group analyzed consisted of 250 valid cases. There were 124 (49.6%) females and 126 (50.4%) males. There was close to a statistically significant difference in the ages of the males ($m=34$) and the females ($m=30$), ($t=0.057$). Marital status was represented by 95 (38%) single, 149 (59.6%) married, 2 (0.8%) widowed, and 4 (1.6%) divorced. Of the 124 females, there were 32 (25.8%) under 21 years of age, 88 (71%) between 21 and 60 years of age, and 4 (3.2%) were above 60 years of age. Of the 126 males, there were 33 (26.2%) under 21 years of age, 88

(69.8%) between 21 and 60 years of age, and 5 (4.0%) were over 60 years of age.

The HMO utilization of ambulatory services totaled 1,749 with 744 (42.6%) being laboratory. The HMO females utilized 856 (48.9%) services with 348 (40.7%) being laboratory. The males utilized 893 (51.1%) services, with 386 (43.2%) being laboratory. The HMO under 20 age group utilized 388 (22.2%) of the ambulatory services, 136 (35.1%) being laboratory. The 21 to 60 age group utilized 1,240 (70.9%) services with 548 (73.7%) being laboratory. The over 60 age group utilized 121 (6.9%) services, 60 (49.6%) being laboratory. The rate of hospitalizations did not differ between the male ($n=18$) and the female ($n=15$), ($t=0.430$).

FFS and HMO Comparison

As the FFS and the HMO were compared, a noted difference in the mean ages was observed. The FFS male and female mean ages were 40 and 41 respectively, and the HMO male and female mean ages were 34 and 30 respectively. When the utilization of ambulatory services between the FFS ($n=1,401$) and HMO ($n=1,749$) groups were compared, the HMO group utilized more services, ($t=0.001$). There were no statistical differences noted in the laboratory usage for the FFS ($n=580$) and the HMO ($n=744$) groups ($t=0.063$). The ambulatory services utilized by the FFS females ($n=823$) and

HMO females (n=856) revealed no differences ($t=0.071$). The differences in female usage of laboratory services was also insignificant ($t=0.063$). When female annual exams with Papanicolaou smears were excluded, no differences of utilization were found in the ambulatory services ($t=0.981$) or laboratory services ($t=0.069$).

Male FFS and HMO Comparison

The FFS male (m=40) was found to be older than the HMO male (m=34), ($t=0.017$). A statistically significant difference was also noted in the utilization of ambulatory services between the FFS male (n=578) and the HMO male (n=893), ($t=0.003$). The mean usage of ambulatory services by the 110 FFS males was 5.26 while the 126 HMO males utilized 7.089, a mean difference of 1.83 services per subject. In all but the 60 to 69 year old age group, HMO groups had a greater mean rate of utilization over their FFS counterparts. The least difference was 1.33 in the 30 to 39 year olds with the FFS mean being 3.30 and the HMO mean 4.63. The greatest mean difference in utilization was 4.19 and was found in the 50 to 59 year old age group. These FFS males (n=18) had a mean utilization of 4.39 and the HMO male (n=24) 8.58. The one 80 year old HMO male utilized 25 services while the eight FFS males 80 or above utilized 136 for a mean of 8.00.

Isolation of laboratory services, out of the total ambulatory services, did not reveal the source of this significant increase in utilization by the HMO male. The FFS male utilized 237 laboratory services and the HMO male 386, ($t=0.301$). Further isolation of practitioner visits, non-practitioner visits, office procedures, immunizations, electrocardiograms, roentgenograms, and special roentgenograms, did not identify any statistically significant differences between the two groups. In six out of the seven variables, HMO subjects mean utilization was greater, but the t-tests did not reveal significant differences.

The FFS males ($n=110$) utilized 253 practitioner visits ($m=2.3$) and the HMO male ($n=126$) utilized 328 ($m=2.6$), and the t-test was 0.242. The FFS males utilized 19 non-practitioner visits for a mean of 2.38 and the HMO male utilized 58 for a mean of 3.22 and the t-test was 0.545. The HMO males ($n=28$) also utilized 30 electrocardiograms ($m=1.07$) while the FFS males ($n=9$) utilized 11 ($m=1.2$). The t-test turned out to be 0.216. Along the same lines the HMO male ($n=39$) utilized 47 roentgenograms ($m=1.2$) and the FFS ($n=9$) only 10 ($m=1.1$), and the t-test was 0.525. The HMO males ($n=9$) also utilized 13 special roentgenograms ($m=1.4$) while two FFS males utilized one each ($t=0.428$). In contrast to this trend, the FFS males ($n=15$) utilized 22 immunization ($m=1.4$) and the HMO males ($n=10$) only 17

($m=1.7$), and the t-test was 0.668. The FFS males ($n=25$) also utilized more office procedures ($m=1.93$) than the HMO males ($m=1.4$) who utilized 14. The t-test was 0.185.

Although the number of diagnoses were not significantly different, a trend is apparent. With the FFS mean of 1.6 and the HMO mean of 1.9, all HMO age groups had a greater mean number of diagnoses than their FFS counterparts. The mean differences ranged from 0.31 in the one to ten age group to 1.25 in the 70 to 79 year old age group.

The number of hospitalizations were not tallied as part of the total ambulatory services. The male FFS group had a total of 12 hospital admissions and the HMO group 18. The FFS admissions were confined to the 30, 50, 60, 70, and 80 year old groups while the HMO admissions spanned all age groups. The most visible difference was noted in the 40 to 49 year old age group with four HMO admissions and no FFS admissions. Ten of the 12 FFS admissions resulted in surgery involving individuals age 50 to 80. Twelve of the 18 HMO admissions resulted in surgery involving individuals age 20 to 80.

CHAPTER IV

CONCLUSION

This study has proven my hypothesis. The HMO of Florida population utilized more ambulatory services than did the FFS population and did not reduce the rate of hospitalizations. Care had been provided at the same clinic by the same providers. The HMO group was found to be younger, and the males were identified as causing an increase in the utilization of ambulatory services. The male was observed to have a suggestive greater number of diagnoses in each age group. A distinct trend of increased male utilization was observed for the age groups, for the specific variables, for the age groups hospitalized, and for the age groups undergoing in-patient surgery.

This data is supported by Luft's (1981) extensive review of HMO studies that clearly revealed that HMO IPA model enrollees utilized more ambulatory services ($t=0.001$). This is displayed in Figure 1. In contrast, the data do not support the HMO concept of reducing hospitalizations by the increasing of ambulatory preventive care (Gaus, cited in Luft, 1981; Luft, 1981). The enrollees from the FFS group were hospitalized 21 times while the HMO enrollees were hospitalized 33 times. These results are similar to

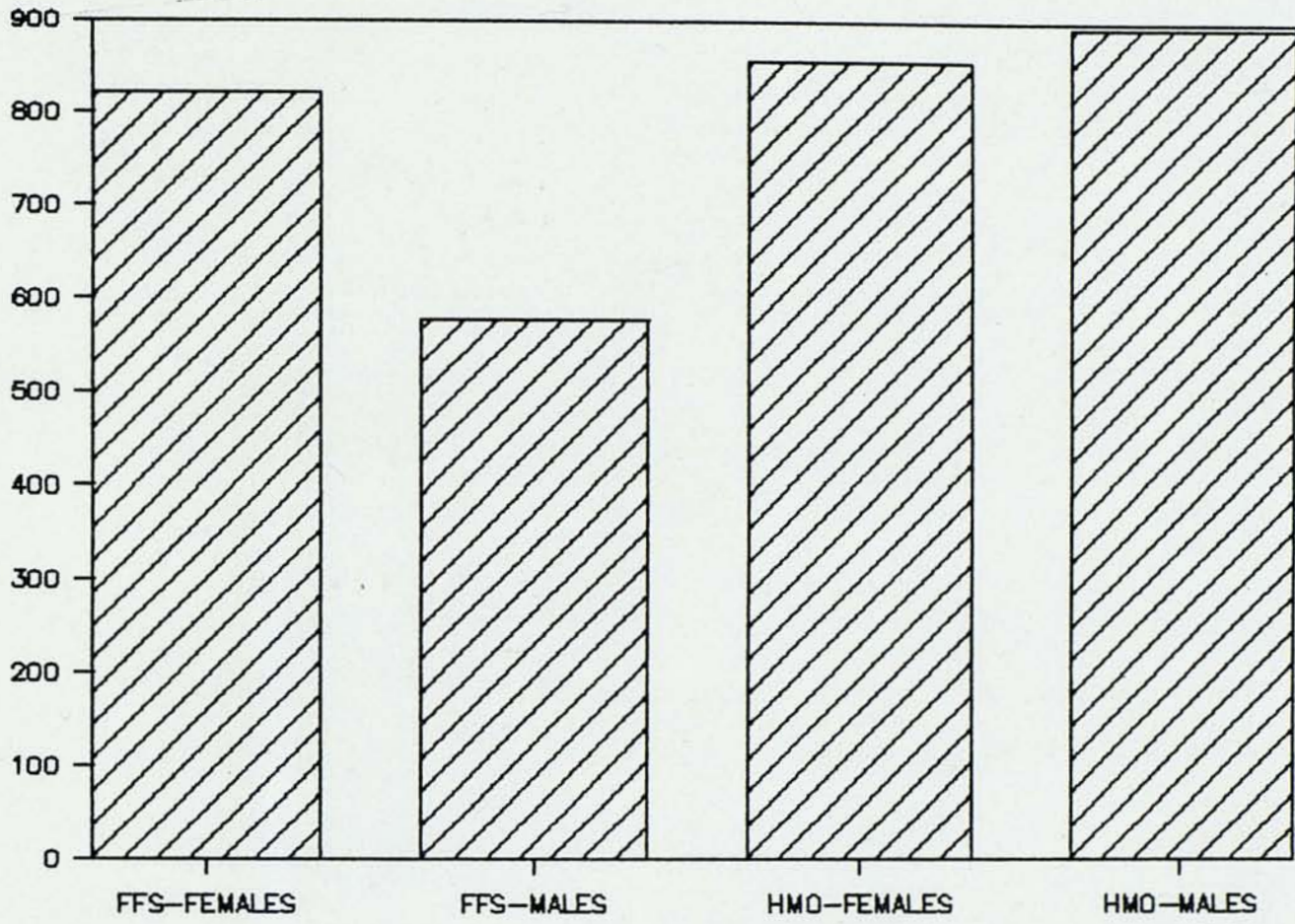


Figure 1. Total Ambulatory Services for Each Group by Sex.

Perkoff's (1976) study that revealed no significant reduction in hospitalizations. In addition, the HMO group was shown to be younger ($t=0.017$). Therefore, in this setting, a younger HMO population, (IPA model), increased rather than decreased the utilization of the health care system.

The male-female distribution and then the age group distributions bring out subtle differences and insight into the variance between the groups. The FFS group consists of 49% males and 56% females, a difference of 7%. This is in contrast to the HMO group which has 50.4% males and 49.6% females, a difference of only 0.8%. It appears that the HMO population has a higher proportion of males, males who utilize more services.

The marital status of the groups reflect the younger characteristics of the HMO group. The HMO group has a greater proportion of singles, and a fewer number of widowed. The proportion of married and the divorced reflects no variation. The sex distribution in these age groups offer additional clarification. The HMO males and females under 21 each represent a greater proportion of the total HMO population than do their FFS counterparts under 21 (see Table 1). In conjunction, the HMO males and females 60 or older are each fewer in numbers than their FFS counterparts 60 or older. This is a distinct pattern

TABLE 1

POPULATION DISTRIBUTIONS PER AGE GROUP AND SEX

| AGE GROUP | FFS | | HMO | |
|--------------|--------|------|--------|-------|
| | FEMALE | MALE | FEMALE | MALE |
| <21 | 15% | 19% | 25.8% | 26.2% |
| 21-60 | 65.7% | 59% | 71% | 69.8% |
| >60 | 19% | 21% | 3.2% | 4% |

representing the HMO group as a younger population (see Figure 2).

The FFS data is supported by the Department of Health and Human Services (cited in Luft, 1981) and Perkoff's (1976) study that identified the female population as utilizing more ambulatory services. This study indicated the increase in utilization by the female population, as compared to the FFS male, was uniform between the FFS and HMO females ($t=0.071$). Even after the elimination of annual exams with papanicolaou smears, there was no difference in laboratory services ($t=0.069$) or total ambulatory services ($t=0.981$). It should be noted that there was an 11-year difference in the mean age. Therefore, an equal number of services were utilized by a significantly younger age group. As a population grows older, an increase in health care utilization can be expected (Dept. of Health and Human Services, cited in Luft, 1981). Taking this into account, this data is predicting a significant escalation in future health care utilization. This groups utilization of health care is roughly 10 years ahead of its time.

The HMO increase in utilization of ambulatory services was due to the male population. As a whole, the HMO population utilized more ambulatory services ($t=0.001$). As mentioned, the females were not the cause of this increase ($t=0.071$). The analysis of total laboratory services again



Figure 2. Mean Ages by Group and Sex.

revealed no difference in this subset of total ambulatory services ($t=0.063$). The HMO male utilized more services (see Figure 3) than did the FFS male ($t=0.003$). But, the variance in FFS male and HMO male usage of total laboratory services was not statistically significant ($t=0.301$). Therefore, the HMO male utilized more services, but they were not laboratory services. Further isolation of specific ambulatory services and age groups was needed to pinpoint distinguishable variants.

As in the case of the female, the HMO male ($m=34$) was found to be significantly younger than the FFS male ($m=40$) ($t=0.017$). This younger HMO group's utilization of ambulatory services ($m=7.089$) appeared to be greater in every age group except one. The mean for the FFS male was 5.26. No specific variable was found to be utilized significantly more by any group, but the trend of more utilization by the HMO subjects was again noted in five out of seven services. An overall increased utilization was observed in seven out of the eight HMO age groups and in five out of the seven services.

The mean number of diagnoses did not vary statistically, but the trend previously mentioned is again prevalent. With the FFS mean of 1.6 and the HMO mean of 1.9, all HMO age groups had a greater mean number of diagnoses than did their FFS counterparts. The differences ranged from 0.31 to 1.25. The data do not support the view

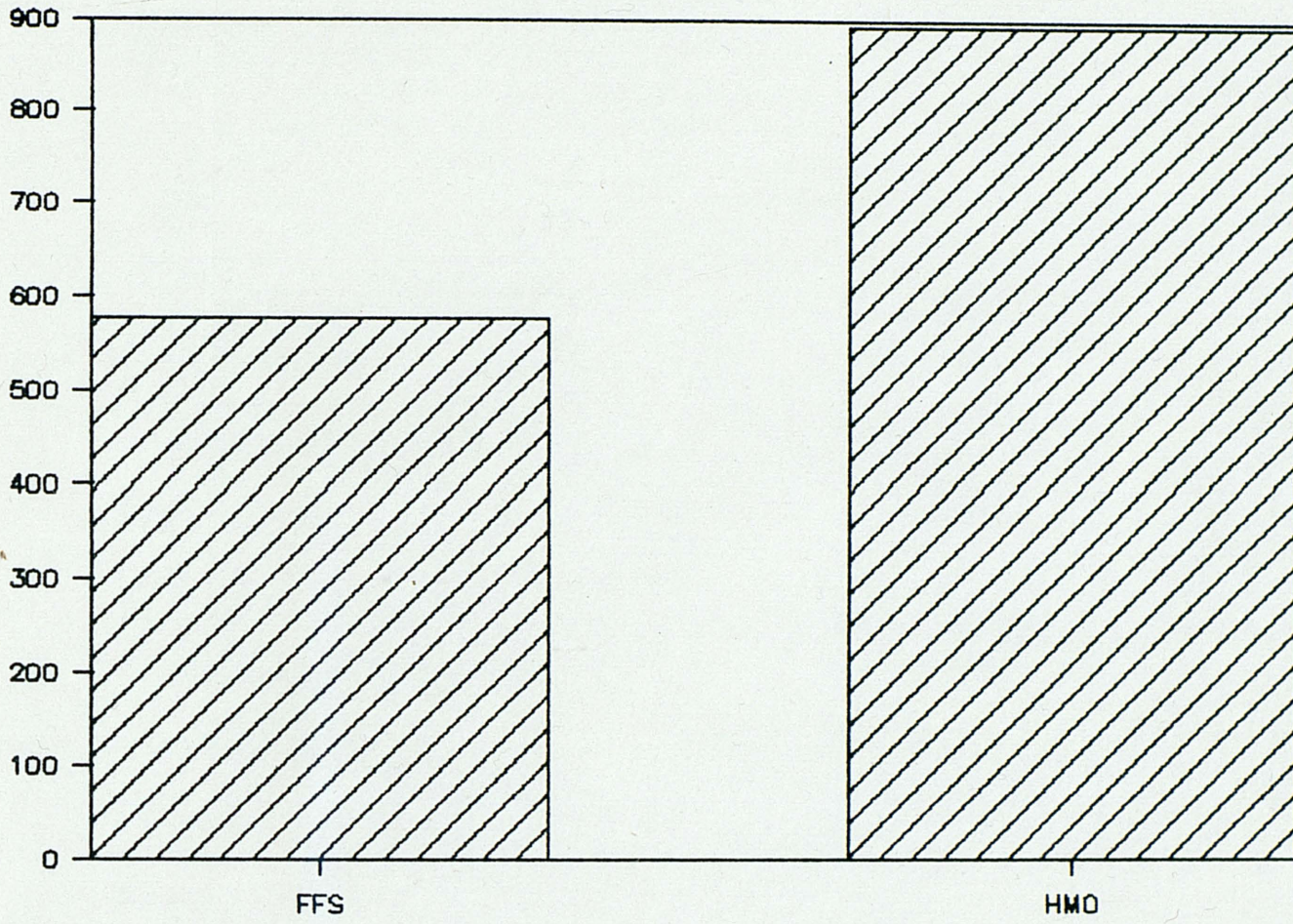


Figure 3. Total Male Ambulatory Services by Group.

that the health of the HMO population may be better (Eastaugh, 1987; Manning et al., 1984; Welch and Frank, cited in Eastaugh, 1987).

The HMO theory of increased preventive care and reduced hospitalizations cannot be used to justify these findings. In fact, more HMO males (n=18) were admitted to hospitals than there were FFS males (n=12). To support the trend of more utilization over a wider group of ages, the HMO hospitalizations spanned all eight age groups while the FFS spanned only five. In addition, HMO surgery (n=12), once admitted, spanned seven age groups. The FFS surgery (n=10) occurred in only three age groups. The data not only do not support the HMO objectives for health care, but directly contradict it.

These data have proven that the HMO population utilizes more services and is younger than their FFS comparison group. There is a distinct trend of this increased utilization across the different age groups and across the different services. This trend is also seen in an increased number of diagnoses across each age group. In addition, the hospitalizations and subsequent surgeries involve a greater number of age groups.

The Health Maintenance Organization of Florida has apparently attracted a younger population with a high proportion of males. In addition, these males are utilizing more services than their older fee-for-service

counterparts. Contrary to HMO theory, this increased utilization failed to precede reduced rates of hospitalization. Therefore, this utilization may represent inefficient organized health care or a sicker population of males. But, the most likely reason is a population of males that utilize free services that they would not otherwise use.

The data also support a prediction of future escalating health care utilization. As the relevantly new HMO system becomes older, so will the population of clientele. If this clientele utilizes more or the same number of services services at a younger age, their demand for services could be expected to increase as their age and tendency for illnesses increases naturally. This is particularly significant for the HMO male whom is younger and presently utilizes more services.

This study offers more much needed ambulatory care data from which future comparisons and studies can be based. As previously mentioned, the ambulatory care setting has not been adequately studied (Gaus, cited in Manning et al., 1984; Luft, 1981), and the United States utilizes 25 percent of its ambulatory health care expenditures on radiography and laboratory tests (Scitovsky, cited in Taub, 1984). Follow-up evaluation of this population in three to five years would be able to identify fluctuations in these utilization rates.

Serious detailed analysis of the HMO IPA models cost effectiveness should be undertaken. As of 1986, there were eight million enrollees in the United States. If this population studied represents the overall HMO IPA population, we are spending millions of dollars in excess health care costs. Proper organized management could curb these expenditures and prevent future escalations.

LIST OF REFERENCES

- Eastaugh, S. R. (1987). Financing health care: economic efficiency and equity. MA: Auburn House.
- Eisenberg, J., Mackie, A., Kahn, L., & Perkoff, G. (1974). Patterns of pediatric practice by the same physicians in a prepaid and a fee-for-service setting. Clinical Pediatrics, 13, 352-359.
- Epstein, A. M., Begg, C. B., & McNeil, B. J. (1986). The use of ambulatory testing in prepaid and fee-for-service group practices. New England Journal of Medicine, 314, 1089-1094.
- Luft, H. S. (1981). Health maintenance organizations: dimensions of performance. NY: Wiley-Interscience.
- Manning, W. G., Leibowitz, A., Goldberg, G. A., Rogers W. H., & Newhouse, J. P. (1984). A controlled trial of the effect of a prepaid group practice on use of services. New England Journal of Medicine, 310, 1505-1510.
- Manbar, M. M. (1985). NPs, MDs, and PAs: Meshing their changing roles. Medical World News, 26, 53-71.
- McDonald, R. B., & Wilke, C. L. (1987). Alternative delivery systems and their impact on physicians. Topics in HealthCare Financing, 13, 47-59.
- Nagurney, J. T., Braham, R. L., & Reader, G. G. (1979). Physician awareness of economic factors in clinical decision-making. Medical Care, 17, 727-736.
- Nobrega, F. T., Kirshan, I., Smoldt, R. K. (1982). Hospital use in a fee-for-service system. Journal of the American Medical Association, 247, 806-810.
- Perkoff, G. T., Kahn, L., & Haas, P. J. (1976). The effects of an experimental prepaid group practice on medical care utilization and cost. Medical Care, 14, 432-449.
- Saward, E., & Sorensen, A. (1982). Competition profit and the HMO. New England Journal of Medicine, 306, 929-931.

Scheier, R. L. (1988, January 1). Can medicine bear the scrutiny. American Medical News, pp. 1, 22.

Scitovsky, A. A. (1981). The use of medical services under prepaid and fee-for-service group practice. Social Science Medicine, 15C, 107-116.

Shoemyen, A. H. (Ed.) (1987). Florida statistical abstract (21st ed.). Gainesville: University Presses of Florida.

Taub, S. (1984). HMOs: The quality of mercy is strained. Financial World, 153, 15-19.

Trimarchi, M. (1987, December 7). Central Florida Business. The Orlando Sentinel, pp. 20-21.