

### Introduction

by James Lubitz and Marian Gornick

Data about the utilization of health care services have been used in the public sector to serve a number of important purposes. One major purpose has been to gain an understanding of the patterns of health care use. By analyzing utilization of services in relation to sociodemographic variables such as age, sex, race or ethnicity, income level, and insurance coverage, knowledge can be gained about the factors that influence access to health care services. By analyzing morbidity, mortality, and hospital readmissions in relation to the provision of services, information can be developed about the quality of care delivered. When data on utilization and payments are analyzed by certain variables such as type of provider, insight can be gained about the appropriateness of those payments and the effectiveness of different health care delivery systems.

The Health Care Financing Administration (HCFA) has been able to analyze the patterns of health care use by Medicare beneficiaries from the records of bills submitted for payment. These data, augmented by data collected in national surveys and special research and demonstration projects, have influenced the formulation of many policy initiatives for the Medicare program.<sup>1</sup> A major influence on the development of the Medicare hospital prospective payment system, for example, was the knowledge gained about the experience of the Medicare program through data based on claims for payment. Claims data are now being used to evaluate certain aspects of the impact of the new system. In contrast to the extensive data on fee-for-service use, information available to HCFA on the use of services in capitated delivery systems is confined to a few aggregate statistics.

The role of health maintenance organizations (HMO's) in the delivery of services to Medicare beneficiaries has grown with the passage of the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982 and is expected to increase substantially in the future. To gain an understanding of the use of data in private-sector capitated delivery systems, and the lessons to be learned from their experience to date, the Office of Research and Demonstrations invited six

organizations to take part in a written symposium focusing on five broad questions relating to HMO data systems:

- The major purpose of their data systems.
- The basic features of their files.
- How their data systems are being used today.
- Personnel and costs needed to operate their systems.
- The kinds of data requests made by employer groups.

These organizations were invited to provide information because of their interest and activities in HMO data systems and data issues. The full set of questions is shown preceding the responses of the participants.

The symposium brings together three kinds of viewpoints on these HMO data issues. First, executives from three HMO's respond to questions about their internal data systems. The contributors are Bernard Neeck, Senior Vice President and Chief Financial Officer, and Daniel Kennedy, Vice President and Underwriter, of the Health Insurance Plan of Greater New York, a large nonprofit network model; Joseph LaAsmar, President, and Mary Tierney, Associate Medical Director, of the Chesapeake Health Plan, a for-profit network and independent practice association (IPA) model in Maryland; and Gino Nalli, President, of M.D. IPA, a for-profit IPA model in the Greater Washington-Baltimore area.

A second viewpoint is provided by Gail Warden, Chief Executive Officer, and Michael Wagner, Director, Data Management Center, of the Group Health Cooperative of Puget Sound in Seattle; and by Mark Hornbrook, Senior Investigator, Merwyn Greenlick, Director, and Marjorie Bennett, Research Associate, of the Center for Health Research, Kaiser Permanente in Portland, Oregon. These authors discuss data not so much from the perspective of the systems in place in their own HMO's but from the perspective of the general information requirements of HMO's (Warden and Wagner) or from the point of view of what the Medicare program might need (Hornbrook, Greenlick, and Bennett).

A third point of view is provided by Laird Miller, from Honeywell Inc. in Minneapolis, who is his company's Corporate Director of Health Systems and its representative on the Washington Business Group on Health, the Midwest Business Group on Health, and the Minnesota Coalition on Health Care Costs. He discusses the kinds of information that purchasers of care need to make sound choices among plans as well as the recent change in scope and focus of Honeywell's data collection activities.

Several broad themes and issues emerge from the articles in this symposium. The first theme is the need for data in the increasingly competitive environment in which HMO's find themselves today, an

<sup>1</sup>See Lave, J. R., Dobson, A., and Walton, C.: The potential use of Health Care Financing Administration data sets for health care services research. *Health Care Financing Review*. Vol. 5, No. 1. HCFA Pub. No. 03154. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Fall 1983.

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environment in which superior management is becoming a requirement for success. Competition may come from other HMO's, some affiliated with large for-profit or not-for-profit chains, as well as from preferred provider organizations, other modified fee-for-service plans, and traditional fee-for-service plans.

In this highly competitive environment, a primary purpose of current data systems in HMO's is utilization control. HMO's are interested in monitoring how their physicians and enrollees use services, such as referrals to specialists, inpatient care, laboratory tests, and prescriptions. They have instituted reporting systems to track the use of these services.

Nearly all of the respondents note the importance of developing their data reports by the demographic characteristics of their enrollees, such as age and sex. Some have also pointed out that it is necessary to link the diagnosis of the patients to the utilization of physician services by specialty in order to effectively monitor the use of services. These data are used by HMO managers for resource control, for planning, for providing physicians with objective data on their practice styles, and for peer comparison.

A second major theme—mentioned by Miller; Warden and Wagner; and Hornbrook, Greenlick, and Bennett—is the desirability of data on health status and health risk of covered populations and on outcomes of care related to patient risk. Risk factors would include smoking, weight, cholesterol level, and blood pressure. HMO's would use such data to manage resources to produce the best possible outcomes. Purchasers of care would use these data to evaluate the performance of providers and health plans serving their employees. In addition, Miller points out the need for employers themselves to collect data on environmental and occupational risk factors for a number of reasons, including tracking the experience from risk exposure to medical care events and costs.

Another important theme is the need for gathering data periodically on consumer satisfaction. Such data are generally collected by means of surveys. Information important to HMO's includes waiting time for appointments, complaint patterns, and reasons for disenrolling. As noted by Warden and Wagner: "Long-term measures of health status will be meaningless unless the HMO administrator can maintain a reasonably stable enrollment base."

An interesting fact brought out in this symposium is the low costs of operating the management information systems at the Health Insurance Plan of Greater New York (HIP), Chesapeake Health Plan, and M.D. IPA. The figure cited for HIP is \$0.46 per member per month; for Chesapeake Health Plan, \$0.48; and for M.D. IPA, \$0.22. Recent site visits were made to the latter two plans. Demonstrations of their systems indicated impressive ability for rapid retrieval of longitudinal data on enrollee encounters.

Finally, Miller raises two issues that are important from the standpoint of the employer. One issue is the

change in management strategy relating to health. At first, Honeywell worked to collect utilization data primarily to contain health care costs. However, their emphasis has recently shifted from "managing health care costs to managing health." Their belief now is that, to manage costs, the employer needs to work to "prevent problems from occurring through early identification and evaluation of personal risks, workplace hazards, and environmental and community health problems." Miller notes that, to achieve this purpose, health plans require sophisticated information systems for collecting data that allow comparisons across plans and providers.

The second major issue raised by Miller relates to the difficulty Honeywell experienced in obtaining data from the fee-for-service insurance carriers that cover 75 percent of their employees and from the HMO's and preferred provider organizations that enroll the remaining 25 percent. With regard to HMO's, Miller notes that some could not "identify by employer group patients who receive care." In contrast to Honeywell's experience, unique patient identifiers are a basic part of the Chesapeake Health Plan and M.D. IPA data systems, and HIP is planning to incorporate patient identifiers into their encounter system.

We believe that these articles provide valuable insight into the importance and the role of data in the changing health care scene. If future changes in HMO data systems are in keeping with the issues raised in these articles, we anticipate the following developments:

- Increasing sophistication in the systems used by HMO's for utilization control and management.
- Increasing demands by purchasers of care for data to judge the appropriateness of premiums, quality of care, and health outcomes.
- Integration of clinical measures into utilization and enrollment data to develop data bases that allow HMO's to manage resources for production of optimal outcomes and to provide purchasers with evidence of good performance.
- Pressure from purchasers of care for common measures to allow performance comparisons across health plans.
- Attempts to develop population-based measures of health risk for employee groups and HMO enrollees.

Developments will depend on the nature of the requests from employers for performance data, on technical advances in measuring health risk and outcomes, and also on any decisions that may be made regarding data about Medicare and Medicaid enrollees in HMO's.

## Questions for HMO administrators on their data systems

*1. What were the major purposes and objectives as you considered a system for maintaining data on enrollment and utilization of services? What kinds of questions and management concerns was the system designed to address?*

2. Please describe the basic features of the enrollment and utilization data systems, including an overview of the types of files maintained. Did your HMO design the enrollment and utilization data system, or did you use the services of a consulting firm? We are interested in both the hardware and systems design. For example, do you have a computerized file of physician visits? What are the major data elements in that file? Can the data be linked for a particular enrollee or physician? Do you have a similar file for hospital admissions and referrals? How might you change the system in the future?

3. How are the systems used now? How important are they to your HMO? Do you generate periodic reports? What variables are of greatest importance in these reports? For example, do you analyze visits per person and/or visits per 1,000 enrollees? What levels of aggregation are used? Are data aggregated by provider and/or by market area? For what issues might you do special analyses? Do you have any examples of how data analyses led to changes in the way you manage your HMO? Is the system used on line also?

4. Relating to personnel needed to maintain the systems and systems' costs: Could you tell us about the number of staff needed to update and maintain the information systems? Could you estimate the cost of operating your system on a per enrollee basis?

5. Employers, both singly and in health care coalitions, are increasingly interested in data on their employees' experience in health plans. What kinds of utilization data have employer groups requested, or do you anticipate such requests in the future?

## Health Insurance Plan of Greater New York

by Bernard J. Neeck and Daniel P. Kennedy

### Introduction

The Health Insurance Plan of Greater New York (HIP) is the country's second largest prepaid group practice plan. HIP began operations in 1947, offering medical care on a prepaid group basis. Members were required to carry hospital insurance, which was purchased through Blue Cross, union, or private plans. Hospital coverage was not offered until December 1, 1978, when HIP was certified as a health maintenance organization (HMO).

Responsibility for HIP policy and operations rests with an unpaid Board of Directors composed of 24 individuals. HIP management is responsible for the operation of the plan.

Of HIP's 900,000 members, 777,000 are enrolled in HIP/HMO. Included in these figures are 75,000 Medicare members, 50,000 of whom are covered through HIP/HMO Medicare supplemental contracts. HIP began enrolling Medicare eligibles in July 1966, the first possible enrollment date after the enactment of Title XVIII of the Social Security Act. At the

present time, HIP has a cost contract with the Health Care Financing Administration (HCFA).

HIP has entered into a single contract with nine affiliated medical groups. This contract is an all-inclusive document detailing the contractual relationship between HIP and the medical groups. It encompasses the medical groups' responsibilities in providing appropriate medical care as well as HIP's obligations toward the medical groups, including compensation.

Medical care is rendered by more than 1,000 Board-certified or Board-eligible physicians who participate in HIP's nine affiliated medical groups and 53 centers located in the Greater New York area. Members may choose any HIP medical group. Family members, if they wish, may select different medical groups. Within the center, members select their own personal physician. Hospital care for HIP members is provided in two community hospitals affiliated with HIP and in other appropriate hospitals.

HIP has a large computer facility and has many specialized computer systems in operation. Of these, the enrollment system is probably the single most important.

### Enrollment system

#### Background

The enrollment system currently in place at HIP was designed and developed in-house by HIP staff and has been in use since 1968. The current enrollment system is a batch system that is run on an IBM 4381 mainframe computer. HIP is presently developing and implementing a prototype (pilot) system for adding data on line.

The major purposes of the file, as designed, were as follows:

- Verification of eligibility of members.
- Billing of premiums.
- Payment of capitation to medical groups.
- Mailing to members.
- Maintenance of data on maturing of members.
- Production of enrollment statistics.

The management of HIP was concerned about a number of issues, and the system was designed to provide information to address these issues. The major concerns were control of premium income and information for rate setting, the age and sex of membership, membership by contractor, distribution of membership across medical groups, enrollment trends for planning new facilities and new programs, and staffing patterns.

#### Enrollment file

HIP's computerized enrollment file is the base from which vital information for the operation of the Plan is derived. The file contains the following major data elements for each member:

- First name, middle initial, last name.
- Month and year of birth.

- Home address.
- Sex code.
- Medical group selected.
- Physician number.
- Medical chart number.
- Medicare number, if applicable.
- Coverage effective date.

In addition, for the contract holder only, the file contains contract number (group number), premium period, and rider code.

The file also contains a complete history of changes of data items. These data changes are retained on line for a period of 12 months. Access to further historical data is available on request.

### Features of enrollment system

The enrollment file contains a number of features important for the administration of the Plan:

- Online checking of member eligibility by policy number, subscriber name, or dependent name.
- Interface with HCFA for enrollment and premium payment for the Medicare population.
- Interface with the New York City government for enrollment and premium payment for the Medicaid population.
- Daily updating of the file.
- Weekly issuance of identification cards.
- Weekly notification of changes to the medical groups.
- Summary enrollment reports, issued monthly, on topics such as major contractor groups, medical group, type of coverage, and age/sex. (A report writer is available so that user departments can obtain their own ad hoc enrollment reports.)
- Information on maturing of members (e.g., change of status for dependent children at age 19, eligibility for Medicare).
- Reconciliation of enrollment file with contractors' records.

HIP is considering the need to redesign the enrollment master file to handle future new products and further support the need of company management for ad hoc reports. To this end, we are currently evaluating the purchase of an automated data-base management system to handle enrollment and utilization files.

Recently, HIP installed a prototype online system at one of our medical groups. The system permits verification of enrollment, schedules appointments, and produces automated encounter reports. Current enrollment data from the HIP enrollment file are loaded into the system each week.

### Support files

*Contractor file*—This computerized file contains major data items pertaining to the contractor, such as name and address, name of the benefit administrator, name of the HIP marketing representative handling the account, past and present premium rate

information, billing data, account anniversary date, and codes describing the benefits purchased.

*Physician file*—The other major support file is the computerized physician file, which contains data on physicians approved by HIP's Medical Control Board. The Medical Control Board is composed of 21 physician members, one-half of whom come from HIP and one-half of whom are distinguished faculty members of New York teaching hospitals. To be considered as a medical group physician, an applicant submits detailed documentation concerning his or her medical education and background to HIP. This information, together with the curriculum vitae, is submitted to the Medical Control Board for review. Only after a positive vote from the Medical Control Board can the physician work for HIP. Data elements include physician's name, New York State and New Jersey license numbers, HIP identification number, medical specialty codes, board specialty status, medical group affiliations (current and past), hospital affiliations, date of birth, and sex. This file is updated daily and contains information on terminated physicians as well as those currently active.

### Utilization system

HIP undertakes a coordinated centralized effort to have an effective utilization reporting system in place for all medical and hospital services. This enables us to monitor costs and recognize emerging utilization patterns. Data on utilization by medical group and service specialty also provide a basis for planning new facilities or programs and determining staffing patterns, as well as providing information required by regulatory agencies and contractors.

HIP has a number of different systems that maintain data on utilization of the following types of services:

- Encounters with professional staff affiliated with medical groups (in and out of hospital).
- Services provided on a referral basis by consultant specialists providing tertiary care.
- Hospital utilization by our HMO membership.

Each system is described separately.

### Encounters with medical group staff

Information on face-to-face encounters with professional staff members is manually entered on encounter forms. These forms are processed in the Research and Statistics Department, and aggregate totals of services by individual physicians, nurse clinicians, and physician assistants are entered into a computer system each month. The major data elements in the computerized file are:

- Number of visits.
- Provider name and specialty.
- Month and year of service.
- Medical group/center where service was provided.
- Location of service, i.e., in or out of hospital.

The system does not contain information on individual members receiving service or details on diagnosis/problem or procedures performed.

The enrollment system and the reports generated enable HIP, on a current basis, to obtain all data relating to services provided to our members. The physician encounters are reported by specialty for each of the medical groups. The system provides HIP management and the medical groups with reports and tables showing the physician utilization rates of services per enrollee, as well as the number of services provided by individual physicians. This information is available for each medical group. Other information details utilization by age and sex for each medical group, as well as the number of services provided in each specialty, including services performed by the Centralized Laboratory Service. Groups that have higher or lower utilization than anticipated are reviewed by our Quality Assurance Program.

The aims of the Quality Assurance Program are not only to identify potential problems but to work with central management and medical group leadership to quickly correct problems. The program's professional staff conducts performance surveys based on protocols covering administrative and clinical activity at the medical group level. A comprehensive profile of each group is provided to both the medical groups' management and senior management at HIP for appropriate joint action.

As part of ongoing efforts to make the system operate more effectively and efficiently, HIP and its affiliated medical groups began planning, in 1984, a major program for automation of medical group support systems. One of the planned programs will result in automated encounter reporting, with data entered at the medical groups and transmitted to Central HIP for additional processing. Some of the data elements that will be captured in the new system are:

- Member identification.
- Diagnosis.
- Reason for visit.
- Procedures/services provided.
- Provider identification.

The automation program will be operational in pilot locations during 1986 and will be expanded to all medical groups thereafter.

### Services by consultant specialists

Rare or highly technical procedures that would be uneconomical to provide in each medical group are paid from the Special Services Fund maintained and financed by HIP. These procedures are performed by consultant specialists under contract with HIP. They include, for example, cardiac surgery, neurosurgery, certain transplant procedures, and reconstructive plastic surgery including skin grafting.

The consultant specialist, on completion of the authorized treatment, submits the medical group's referral form to HIP for processing and payment.

These referral forms are also used by HIP to develop utilization reports. The following data are entered into the computerized Special Services Fund file:

- Patient's policy number, contract number, medical group, date of birth, sex, and relationship to subscriber.
- Date of service.
- Codes identifying Medicare or Medicaid status.
- Code number and specialty of referring group doctor.
- Code number and specialty of consultant specialist.
- Current procedural terminology (CPT) code number identifying type of treatment rendered.
- Amount of approved payment.

Based on this information, utilization reports on services provided and costs of these services are developed by medical group and procedure.

### Hospital utilization

The hospital utilization data for non-Medicare HIP/HMO members are derived from the computerized hospital claims file. This file is updated daily, and reports are periodically run from it. These reports summarize services by medical group, hospital, age and sex of patient, and type of service.

The major data elements in the computerized file are:

- Patient's policy number, contract number, medical group, date of birth, sex, and relationship to subscriber.
- Hospital code.
- Date of admission.
- Number of paid hospital days.
- Diagnostic information based on the Ninth Revision of the International Classification of Diseases, including type of service.
- Amount paid to hospital.

The hospital utilization reports generated from the enrollment system enable HIP to monitor total cost and hospital days per 1,000 enrollees for the Plan. Also, the reports enable HIP to monitor cost and days by medical group as well as diagnosis. Variations from targeted costs and days are investigated.

Medicare claims are processed by Medicare carriers, and utilization data are not provided to individual insurers.

### Data requests

HIP receives requests from regulators, contractors, business associations, and other health care coalitions for enrollment, cost, and utilization data. These requests are for aggregate data as well as specific breakdowns, such as for age and sex.

Utilization and enrollment data for Medicaid eligibles enrolled in HIP are provided on a regular basis to the New York City Department of Social Services. A Medicare Cost Report reflecting the reimbursable cost for Medicare beneficiaries enrolled

in HIP is sent to HCFA. Enrollment information concerning members insured through the Federal Employees Health Benefit Program is provided to the program.

Over the last few years the requests for data have increased significantly. HIP has responded to these requests whenever possible and will continue to do so in the future.

### **Management information system operating costs**

For the 1986-87 fiscal year, HIP anticipates a total expenditure of \$5 million for the Management Information Systems Department. This figure includes the cost of computer rental and professional staff as well as overhead items such as rent and utilities. The present HIP enrollment is 900,000 members, so this results in a cost of \$0.46 per member per month. This expenditure estimate includes the enrollment system's expense as well as the costs of providing other data processing services to HIP Central, medical groups, contractors, and regulators.

## **Chesapeake Health Plan, Inc.**

by Joseph L. LaAsmar and Mary B. Tierney

### **Background**

The Chesapeake Health Plan (CHP) is a nonprofit, State-licensed health maintenance organization (HMO) in the State of Maryland. It began operations on the grounds of Baltimore City Hospital (now Francis Scott Key Medical Center) in July 1976 under a prepaid Title XIX contract with the State of Maryland. In 1979, CHP was licensed to operate as a State-certified HMO. From 1979 to 1981, CHP marketed chiefly to the population eligible for Medicaid (i.e., Maryland Medical Assistance). In 1981, the Plan began the process of marketing to the private sector.

Further, CHP management made the decision to expand from their original five sites, which were located mainly in East Baltimore. Those original sites were operated through a contract for physician services with Chesapeake Physicians, P.A. (CPPA), a large multispecialty group practice. The decision was made to contract with additional existing provider groups and hospitals to provide a comprehensive Baltimore-wide network serving an enrollee patient population from both Medical Assistance and private sector populations. We also decided to enter the private market in Anne Arundel County, starting in Annapolis and expanding through Severna Park and Glen Burnie.

At the same time that we were making our expansion plans, the Robert Wood Johnson Foundation announced a grant competition entitled

“A Program for Prepaid Managed Health Care.” The grant specifically concerned the Medicaid-eligible sector. Chesapeake Health Plan applied for the grant and was one of 12 awardees from across the country. The purpose of the project is to test whether we can enroll the Medical Assistance population, provide high-quality health care, and develop utilization review programs and techniques for the benefit of patients, providers, and third-party payers alike. Since the award, we have been engaged in the task of expanding our provider base and our Medical Assistance and private sector enrollment. The management information system (MIS) is playing a crucial role in marketing, quality assurance, and utilization review as we expand in metropolitan Baltimore and Anne Arundel County.

### **Purposes and objectives of MIS**

At the time the MIS was first being developed, the purposes and objectives were quite different from our present needs. The objectives considered during the developmental stage included:

- Automating and increasing the speed of processing for all types of data.
- Enhancing the accuracy of data, data outputs, reports required by various regulatory agencies, and internal reports.
- Devising Plan management standards and comparisons through review of utilization data by age, sex, and employer group.
- Improving clinical management standards and comparisons (e.g., for physician productivity—visits per week, per month, and so on) through use of data on such variables as length of visits and type of patient and problems seen.
- Implementing medical quality assurance by reviewing automated medical records for given diagnoses and comparing the data with standards set by a quality assurance committee.
- Developing a utilization review system in which data—including data on specialty referrals, emergency room use, and hospitalization by physician and by health center site—are monitored.
- Developing an automated medical record that includes problem lists, pharmaceutical orders, and the interaction of drugs with other drugs and forms of therapy.
- Running clinical trials and other basic medical research studies.

Over the years, the objectives of the system have been changed and simplified. Our main concerns are now to provide enrollment and demographic information, utilization statistics, and financial information. Despite the changes in objectives, the system remains an encounter-driven system that allows for clinical and plan management. Unlike some other systems, its main purpose is not solely to address financial concerns such as claims processing and billing.

## Description of data

Our management information system is a hybrid that utilizes existing hardware: Nixdorf, IBM, and molecular interfaces. The main system is encounter driven. Demographic information on the enrollee is updated at the time of an encounter. In addition, an encounter form is generated at each visit. The encounter form serves a dual purpose. The first page of the form becomes a permanent part of the medical record. The second page is imprinted through a carbon. Various procedures ordered, such as a complete blood count, are translated on the second page with their corresponding current procedural terminology (CPT) code. The second page of the encounter form is forwarded to be keypunched into the computer. The reports (outputs) generated provide information in the categories of enrollment, utilization, and financial statistics. (Figure 1 outlines the Ambulatory Care Encounter System used by the Chesapeake Health Plan.)

### Enrollment data

The enrollment data provide demographic information such as age, sex, family configuration, location of work and home. For those enrollees who are Medicaid eligible, the system provides information concerning category of eligibility, such as Aid to Families with Dependent Children or Old-Age Assistance. It also indicates at which of our various sites the person is enrolled.

### Utilization data

The utilization data provide information for three overall categories: patient profiles, physician profiles, and aggregated utilization statistics.

The patient profiles can be linked for a particular patient/enrollee. Information that can be retrieved on request includes:

- Problem lists by individual patient and attending physician.
- Detailed automated medical records that include diagnosis for each encounter, pharmaceuticals prescribed by encounter, referrals made by encounter, and attending physician.

The physician files supply reports on individual physicians and include the following:

- Monthly activity by provider (i.e., number of patient encounters per month).
- Diagnosis by provider.
- Specialty referrals made per 100 encounters.
- Laboratory procedures ordered per 100 encounters.
- X-rays ordered per 100 encounters.

Aggregated utilization files include:

- Total number of referrals to various specialists by department—orthopedics, dermatology, etc.
- Hospitalization by health center site and provider.

- Ancillary services (i.e., prescriptions, laboratory procedures, and X-rays) by site and provider. The average numbers of prescriptions per encounter and laboratory procedures per encounter are calculated for the report.
- Statistics by site and by provider. Encounters are calculated by sex, age, and diagnostic class.
- Statistics on diagnoses. The top diagnoses file lists the 10 most common diagnoses for adults and pediatric patients.

### Financial data

A monthly trial balance is provided, as well as information on claims processed and paid. The system also generates checks for claims to be paid. Unlike many systems now in operation, our MIS was designed in-house, so the Plan did not have to adapt to an existing system sold by outside vendors. Its design was a physician-guided effort. Thus, the major emphasis of the MIS is on clinical and plan management rather than on being a financial claims payment system only.

### Uses of data

Specifically, the system is used now for utilization review and quality assurance, billing for coordination of benefits, and claims processing for and reports on specialty physicians and inpatient hospital stays. The MIS allows us to compute capitation payments to provider groups who are providing services on a contractual basis. For example, in obstetrics and gynecology, we total the previous year's actual payment experience by the total membership and derive a capitation payment per member per month. The system's aggregation of the data by provider, by enrollee, and by market area is particularly important for utilization review, financial management, and plan management (such as marketing).

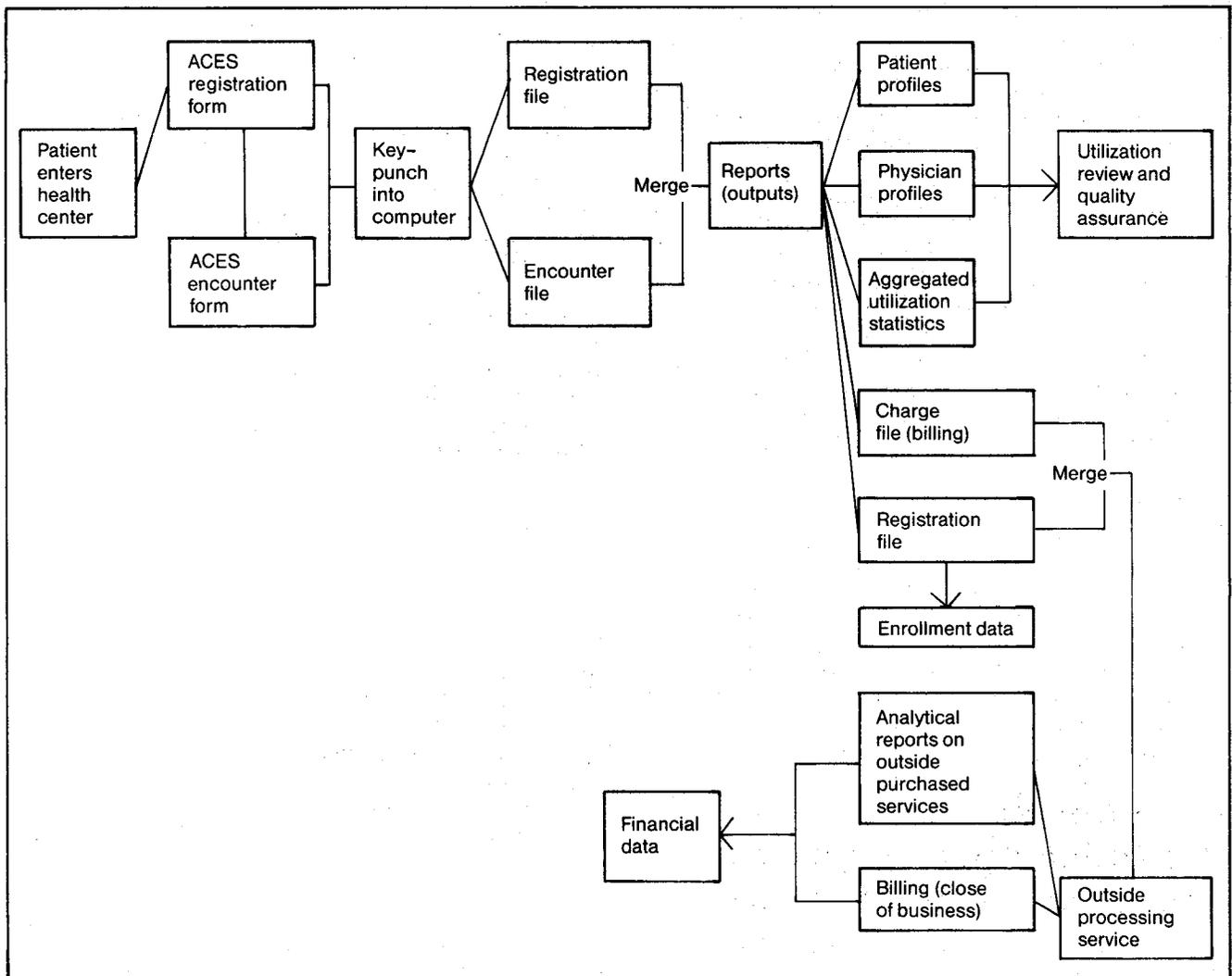
The system is used for marketing in both the private and public sector. Using the demographic information available to us, marketing staff is able to compute rates for the private sector and pinpoint areas of the city to be targeted for intense marketing efforts. We have the capability to review primary and specialty physician utilization and hospitalization rates by employer and other groups (i.e., Medicare, Medicaid). We also have data on age and sex cohorts by these groups. We are considering the possibility of experience rating private employer groups depending on their utilization of services.

Reports are generated on a weekly, monthly, and quarterly basis. The data are aggregated by provider, by site, by specialty of the provider, and by financial class and/or group.

The variables we analyze that are of greatest importance relate to utilization patterns by providers and enrollees. They are:

- Number of referrals by provider per 100 encounters.
- Number of laboratory procedures by provider per 100 encounters.

**Figure 1**  
**Ambulatory Care Encounter System (ACES) management information system**



- Number of X-rays by provider per 100 encounters.
- Inpatient utilization by provider, by site, and for the Plan as a whole in terms of days per 1,000 enrollees and admissions per 1,000 enrollees.

The utilization data by provider are supplied to each site medical director, who can use the data to modify provider behavior vis-a-vis specialty referral, laboratory usage, hospitalization, etc. Individual and site utilization patterns are compared with Plan-wide standards, which are set by the Quality Assurance/Utilization Review Committee. For example, we would expect that 10 of 100 pediatric encounters (under 19 years of age) would result in a specialty referral, whereas 30 of 100 adult medicine encounters would be referred to specialists. If a primary care provider's referral rates consistently vary more than 10 percent from the standard, his or her referrals could be reviewed individually by the medical

director. In some cases, prior approval for referrals may be necessary.

We also analyze costs per day for all hospitals in the area. These data include the basic facility costs, laboratory charges, and X-ray charges. We have been able to pinpoint certain hospitals that have excessive facility and ancillary services charges. We have several options. For example, overutilization of ancillary services has been of special concern in teaching hospitals. In response, management has met with hospital administrators and chiefs of services with regard to the use of inpatient ancillary services. If the problems cannot be resolved, we have, from time to time, steered admissions to other facilities that provide high-quality care at a more reasonable cost.

We also perform special analyses that include data from patient satisfaction surveys. The analyses may address studies about waiting times for appointments

with primary care and specialty providers. We have also run special analyses that allow us to improve patient management. For example, when the new Hemophyllis Influenza B (HIB) vaccine became available, we developed a program to identify all children aged 2-5 years. We then contacted the parents of all these children, advising them to bring the children into the health centers in order to receive the HIB vaccine.

Finally, several of these information subsystems are on line. They include the registration file, which has demographic data. This information is used daily to update information on individual enrollees, such as additional health insurance carried by the enrollee, address changes, and additions to the family. Individual patient health histories, including problem lists, medications, referrals, and hospitalizations, are also on line. Physician profiles of their patient population by diagnosis are available.

## Costs

Costs for maintaining these systems and reports are quite reasonable. Costs on an enrollee basis can be determined by aggregating the per-encounter costs generated each time the system supports a face-to-face enrollee visit with a provider. The cost per encounter is approximately \$1.45, excluding corporate overhead and indirect charges.

Cost per encounter can be broken down as follows:

Total:	\$1.45/encounter
Personnel:	\$0.72/encounter
Forms:	\$0.07/encounter
Machines and equipment:	\$0.14/encounter
Specialty referrals and billing:	\$0.52/encounter

Chesapeake Health Plan enrollees average four encounters (including specialty visits) per year. Therefore, the estimated cost per enrollee is \$5.80 per year, or \$0.48 per enrollee per month.

## Requirements for future systems

After 4 years of using our MIS, we have made some changes. Some on-line capabilities of the computerized medical record have been dropped, although the statistics are still available on request. We have also felt a need to revise and simplify our reports. Many of the hard-copy reports are very complex and detailed, making them difficult to utilize by inexperienced persons. We are interested in providing reports which would allow management to review physician practice patterns vis-a-vis referral rates, use of ancillary services, hospitalization rates, and referrals to emergency rooms. In addition, marketing and management need utilization reports by employer group in order to develop rates and to key in on specific marketing areas and groups.

We are now in the process of revising our MIS. An effort is being made to simplify future outputs in order to make them more immediately useful to line management. We anticipate that marketing,

utilization, and financial data will remain of utmost importance. At the present time, employer groups have not requested utilization data on their employees. However, we would not anticipate any problems with providing requested information.

Finally, we believe that the development of a management information system is an evolutionary and ongoing process. We intend to reevaluate the system in order to make it useful in the management of our HMO.

## M.D. IPA Health Plan

by Gino A. Nalli

### Introduction

M.D. IPA is a health maintenance organization (HMO) serving the Greater Washington-Baltimore area. In operation since January 1981, it now has a membership of approximately 90,000. Services are provided through a network of about 2,000 providers and most of the hospitals in the area. M.D. IPA originally entered into a Medicare cost contract for its approximately 1,500 Medicare members. Since early 1986, however, it has operated under a risk contract. M.D. IPA is a for-profit corporation, its stock owned principally by physicians.

### Management information system

On one level, the objective of the M.D. IPA management information system (MIS) is to automate those administrative processes that are necessary for the accurate and timely identification of enrolled members, collection of revenue, and payment of claims. Of equal concern, however, is the need to provide timely data necessary to the management of the prepaid program, particularly with regard to evaluation of our experience with various enrolled populations (i.e., commercial, Federal, individual, and Medicare). This information enables senior management to initiate appropriate program refinements. The information necessary for program management is provided by the data collected through the administrative enrollment and claims payment processes. A final objective is the ability to manipulate and format the data produced through the MIS to respond to a series of "what if" questions. This capability is considered critical to ensuring flexibility in the management process.

The M.D. IPA information system is an in-house, interactive, data-based MIS. Hardware is the Honeywell Level DP-6 with firmware provided by Ultimate Corporation. The PIC operating system is utilized. M.D. IPA purchased access to the software from Comtec Corporation, which developed a basic MIS package for the HMO industry. Comtec provided significant customization of the product to meet M.D. IPA's specific operational configuration. Enhancement of the MIS is a continuing activity as

the needs and design of M.D. IPA evolve. These changes are presently accomplished by an in-house MIS staff.

The MIS manager, who reports to the Vice President of Operations, is responsible for day-to-day operations of the system, programming, hardware enhancements, and establishing department objectives and priorities. The MIS staff in 1986 includes two full-time development programmers, one full-time maintenance programmer, a personal computer coordinator, and two part-time operations coordinators. The direct operational costs for MIS in 1986 total approximately \$225,000, or \$0.22 per member per month.

The basic reference files in our MIS are member, group, provider, procedure and diagnosis, and encounter history. The basic features of each file include:

- *Member*—Demographic information about the subscriber and dependents enrolled in the Plan.
- *Group*—Billing information about each membership group (i.e., rates, benefits, plan, and contract date).
- *Provider*—Descriptive information about contracting physicians and other providers that is necessary to determine payment status.
- *Procedure and diagnosis*—Listing of allowable diagnoses and procedures for coverage.
- *Encounter history*—Data about actual utilization experience and costs for services provided.

Data manipulation within each file can be easily accomplished with an integrated report generator, for example, an analysis of subscriber residences by ZIP Code. Analysis of data among major reference files usually requires specific programming, which is provided by in-house staff.

The MIS enrollment system is derived from the member and group reference files. The utilization system is derived from the member, provider, and encounter history files. Both components of the MIS are critical to the operation of M.D. IPA.

Periodic reports are generated for utilization analysis, rate setting, financial reporting, market analysis, and other specific management inquiries. The online interactive capability of the system permits data aggregation at different levels, depending on the specific need. For example, member utilization by primary care specialty can be reviewed vis-a-vis utilization by all primary care services vis-a-vis all physician services. Standard reports are, in general, directed to monitoring volumes and costs. Aberrations in these monitoring reports often trigger special analysis to determine influencing factors and causes. For example, deviations from budgeted revenues per member per month would result in an analysis of variances in average contract size, average family size, and subscriber contract mix.

## Future concerns

As HMO's increasingly penetrate the health care market, employers are demonstrating a growing interest in understanding the pricing, risk sharing, and

benefit configuration of HMO's. Self-insured employers are particularly vocal with regard to these issues because premium expenses and any savings as a result of efficient utilization methodologies are outside their control and do not benefit them.

This national employer trend is certainly being felt at M.D. IPA, and we anticipate that the trend will continue to grow. To date, however, employers have been imprecise in articulating specific information requests. Confidentiality issues certainly exist. More fundamentally, however, employers are wrestling with questions concerning what constitutes a reasonable basis on which to deal with HMO's and what constitute the measures by which they can evaluate the relationship. Increasingly, M.D. IPA finds itself working with employers and reaching a consensus as to which data are appropriate to the employer needs as well as available through our organization's MIS.

## Group Health Cooperative of Puget Sound

by Gail L. Warden and Michael E. Wagner

### Introduction

Physician oversupply, excess hospital capacity, prospective reimbursement practices, and the persistent rate of medical care cost increase are driving health care providers, insurers, and purchasers to develop relationships that blur traditional distinctions. Many aspects of emerging health care arrangements mimic existing health maintenance organizations (HMO's). Information requirements and data systems that meet HMO administrator needs are applicable to these emerging delivery systems. At the same time, HMO information requirements are becoming more complex. What are these requirements and specific data needs and what are the implications for HMO data systems? These questions are answered in the context of a brief overview of differences between HMO's and traditional fee-for-service systems and the effects on HMO's of marketplace and health care policy changes.

### HMO's in transition

Health maintenance organizations straddle two businesses; they both provide and insure health care. They are at risk for providing generally comprehensive care within the constraints of fixed prepaid revenues. This dual business perspective and a fixed income per enrollee motivate significantly different behavior and information needs when compared with the traditional fee-for-service health care system.

A few large HMO's have been established for many years: Group Health Cooperative of Puget Sound, a 350,000-member Northwest HMO, celebrates its 40th anniversary in 1987. However, the dominant model within the U.S. health care system has been charge-

reimbursed fee-for-service medicine. In the early 1970's, Dr. Paul Ellwood, frequently referred to as the Father of the HMO Act, concluded that charge-based reimbursement practices rewarded providers for intensively treating illness in hospital environments and discouraged the practice of preventive medicine; prepaid HMO's, with a ceiling on revenues, encouraged aggressive preventive care, emphasizing early detection and ambulatory treatment in order to reduce expensive hospitalizations. His observations have been substantially validated by the Rand Experiment in Economical Care (Enthoven, 1985). In this longitudinal study, it was found that Group Health Cooperative provided overall care at 28 percent less cost and had hospital admission rates and days fully 40 percent lower than those for comprehensively insured patients in the fee-for-service medical system. Most importantly, these savings were achieved with equivalent health outcomes in a population not biased toward atypically healthy individuals.

For HMO's, the days of this "natural" cost advantage over the fee-for-service sector are ended. Tax Equity and Fiscal Responsibility Act legislation implemented prospective reimbursement practices for Medicare beneficiaries. Prospective reimbursement has been quickly extended to non-Medicare populations by insurers. In the fee-for-service sector, these changes, coupled with employer initiatives to contain costs, have sharply reduced numbers of admissions and increased the number of outpatient visits. To remain competitive with leaner fee-for-service cost structures, HMO's must increase the sophistication of their information systems.

## HMO trends

Health maintenance organizations directly provide care or contract for medical services from primary care and specialty or hospital providers in a variety of arrangements, usually described by model type (staff, group practice, individual practice, or primary care network). Different information needs have traditionally been ascribed to each delivery arrangement. Differences have been overemphasized; data needs are equivalent across models.

The information needed to rate plans is increasingly complex. The 1973 Health Maintenance Organization Act dictated that HMO premiums be based on the average cost to provide care for all enrollees (community rating). Only recently have amendments to the act permitted alternative rating methods. Employers now press for rates based on experience or class risk rather than average cost.

Businesses, seeking to control employee benefit costs, increasingly demand leaner mix-and-match benefit packages. Indemnity insurers are eager to fill this need. HMO administrators must be able to respond flexibly.

In contrast to past conditions, each of these trends increases the need for detailed, rather than aggregate,

enrollment, cost, and utilization data across five arenas.

## Information requirements

Health maintenance organization administrative data needs may be broadly classified as:

- Planning.
- Assessing risk and designing and pricing products.
- Securing the delivery system.
- Managing plan performance.
- Assuring quality of care and customer satisfaction.

In addition, HMO administrators provide information for several "publics," each viewing these areas from its own perspective. The publics include the directors and managers of the HMO; customers, both members and employers; providers; legislative, financing and regulatory bodies; and investors (in for-profit settings). What are the data needs for each area?

### Planning

The focus for planning activities within HMO's is shifting away from the traditional emphasis on facility or departmental planning toward program-based planning. Program-based plans emphasize the continuity and outcome of health care across all providers and services. Group Health Cooperative (GHC) has developed a number of program plans addressing such dimensions as eye care, musculoskeletal care, pediatric care, women's health care, and cancer care. For example, GHC's cancer care program plan coordinates risk assessment, screening, and prevention activities with ongoing medical care. Through well-defined protocols, it links primary care physicians and practitioners in specialty, hospital, skilled nursing, home therapy, custodial care, hospice care, and psychosocial service arenas. Care delivery plans are then tied to capital and staff planning and to research activities.

Information systems that facilitate this type of planning require not only a high degree of integration of internal enrollment, clinical, claim, utilization, and cost data, but also the ability to include external data. Examples of external data include trends in marketplace demographics and health risks, characteristics of health care providers operating in the marketplace, market potential, competitor data, expressed employer needs, and public policy directions.

### Risk, product design, and pricing

With relaxation of the community rating requirement, accelerating demands for alternative benefit packages, purchaser requests for experience rating, and the production of new competitive products stemming from innovative alliances between commercial indemnity insurance companies and providers, HMO administrators are faced with product definition and pricing problems analogous to those of the commercial insurance industry.

Commercial insurers have broad experience in underwriting procedures that protect against adverse selection. They have developed flexible funding arrangements for large clients. The arrangements utilize, individually or in combination, varied techniques such as experience-rated contracts, retrospective rating plans, "cost-plus" plans, "reserveless" group insurance, minimum premium contracts, and stop-loss risk sharing. HMO administrators must address rating requirements for benefits using commercial insurance underwriting techniques (Witter, Bluhm, and Wang, 1986).

HMO data systems must effectively link exposure (enrollment) data with claim and cost data for predefined underwriting categories. Often this is difficult, particularly for staff and group model HMO's, which do not track the detailed service data.

Exposure data include such characteristics as rating category, number of dependents, and subscriber months exposed and corresponding data on income, group, industrial classification, and geographic area matched with exposure period. Claim data include such characteristics as patient age and sex; subscriber-patient relationship; provider identification; place and date of service; discrete services provided, with associated costs; and diagnosis and adjudication information (plan, group, coverage, copayments, capitation- and claim-paid amounts). Traditional community rating does not require detailed service cost data. This presents a particularly acute problem for staff and group models that formerly had little need for discrete service information.

Appropriate statistical techniques must be applied to exposure and claim data to price health care benefits. This is particularly true for smaller groups for which direct cost experience as measured by last year's claims is not an actuarially valid basis for setting rates. Rates must be based on the risk associated with the exposure. For this reason, it is mandatory that employers provide relevant data. In order to support requests for tailored benefit packages and class- or experience-based rates, the data provided must minimally include age and sex distributions of employees and dependents.

### Securing the delivery system

HMO administrators contract with physicians and facilities to provide care in a variety of ways, ranging from directly employing staff and owning and operating facilities to individual practice and preferred provider agreements. In each agreement, HMO administrators and medical directors must focus on cost control while maintaining standards of care.

To achieve these objectives, a variety of delivery and contractual arrangements have been developed. Primary care physicians typically perform a "gatekeeping" function. The intent of gatekeeping is to deliver as much care as possible in the primary care setting, reserving more costly specialty and hospital resources for only those patients requiring such care. Gatekeeping with salaried staff has traditionally been

accomplished through internal protocols and peer review. Group, network, and individual practice arrangements usually rely on capitation agreements by which some portion of the capitation is set aside in a risk pool. This risk pool is distributed only if specialty referral and hospital costs are within expectations. Where volumes justify, capitation arrangements may also be negotiated with specialists, hospitals, and long-term care facilities.

HMO data systems must therefore produce information to support distribution of incoming premiums to capitated provider categories and provide for corresponding risk pools. At GHC, this is accomplished by linking each enrollee in the membership system to the enrollee's primary care physician. Simultaneously, the HMO data system must be able to track the gatekeeping physician's management of primary, specialty, referral, and hospital utilization. GHC employs internal and external specialty referral protocols and has developed corresponding computer systems for referral management. Case management systems are used to coordinate care under program plans.

Utilization data simply tabulated by physician are inadequate for administering risk pools when the demographic characteristics of the physician's "panel" (assigned patients) varies. GHC defines age and sex cohorts with associated utilization factors to standardize primary care panels. Primary care panels are inadequate predictors of specialty care utilization, however. Case-mix characteristics are required if specialty care is capitated. Therefore, data on diagnosis, diagnoses-related group (DRG), and severity of illness should be linked to specialty utilization patterns.

Preferred- or designated-provider agreements are commonly used to secure hospitalization and other facility-based care. Claims and utilization data systems must provide information to support multiple reimbursement schemes, including such combinations as reasonable and customary, fixed discount, volume-based discount, and geographic-area-specific schedules.

### Managing plan performance

HMO administrators and medical directors must manage plan performance in several domains. These domains include marketing and membership objectives, financial performance, health service delivery, product line performance, practitioner and provider performance, and quality of care.

*Operational performance data*—The most complete distillation of critical performance measures and required data for HMO administrators is described in a monograph for HMO managers (Birch & Davis Associates, 1983). In this study, conducted for the Office of Health Maintenance Organizations, management reports solicited from 45 HMO's were summarized. Marketing-membership, financial management, and health services delivery domains are

addressed. Representative examples of summary data include:

- Summaries and analyses of membership, contracts, and accounts.
- Analyses of revenues, expenses, and profits per member per month.
- Analyses of hospital, physician, and other outpatient medical costs.
- Key financial and operational indicators.
- Analyses of hospital, physician, and other outpatient service utilization.

Most existing HMO data systems are insufficiently integrated to easily produce these indicators.

*Product line performance data*—As multiple benefit structures evolve, product lines emerge. Few HMO data systems have the capability to monitor the performance of specific product lines. Data to support such analyses require development of benefit categories and levels typical of commercial insurance products. Examples include describing benefits (products) in terms such as basic health plan, dental coverage, vision coverage, prescription drug coverage, and long-term care insurance. Within product categories, levels of coverage must be specified, such as a split between high and low options of the basic health plan or between hospital and medical/surgical benefits. Adjudication systems for processing claims must attach costs and assign services to specific utilization categories corresponding to benefit structures. Cost data by category must then be matched to corresponding allocations of incoming premiums. Among the more difficult problems in this area is the typical lack of mature cost-accounting systems in staff or group model HMO's. In the community-rating era, sophisticated cost accounting was an unnecessary "overhead" expense. GHC is installing enrollment and claims systems derived from the insurance industry that are capable of tracking our various product lines and benefit plans. Although predominantly a staff-model HMO, GHC tracks both claims and internal encounters and is employing increasingly sophisticated cost-accounting techniques.

*Practitioner and provider performance data*—Practitioner and provider performance management hinges on the ability of the HMO administrator and the medical director to influence specific practitioner behavior while maintaining standards for quality of care. With the strong tradition of physicians autonomously determining practice styles and being reimbursed on the basis of production of services, this represents a unique challenge, particularly in nonstaff models. It is the critical variable in achieving cost control.

Physicians must be given constructive, direct, and useful feedback on their practice styles. Among the more effective approaches is production of peer-comparison reports for selected utilization measures. GHC uses a number of peer-comparison reports to provide physicians with objective data by which they can evaluate their own practice styles.

In the primary care setting, key variables include referral rates to specialists, hospitalization rates and lengths of stay by DRG, use of substitute facilities for inpatient care such as surgery centers, and use of major ancillary department services (particularly prescribing patterns for pharmaceuticals). To be meaningful, utilization and cost data must be standardized for the demographic characteristics of patient panels.

In specialty and hospital settings, key variables include unusually costly ambulatory procedures, secondary referral rates to other specialists, hospitalization rates and lengths of stay by DRG, use of substitute facilities for inpatient care such as surgery centers, and use of major ancillary department services. To be meaningful, utilization and cost data must be standardized for the case-mix characteristics of specialty workloads.

To be useful both primary and specialty physicians, data must be succinctly presented. Therapeutically equivalent but less costly alternatives must be identified. This is particularly true for drugs in nonstaff models where a formulary is not in place and where wide variations in the costs of equivalent drugs prevail.

*Assuring quality and customer satisfaction*—The bottom line to health care is its efficacy in maintaining or improving health status and satisfying the customer at acceptable cost. Efficacy of care is measured in terms of outcomes that span long periods of time. HMO administrators must take a longer view than the next quarter's profit performance in this area. This is part of the impetus behind program planning, as described previously. It represents a fundamental shift from the past focus of managing care on the basis of discrete events such as the cost of a visit or a hospitalization. Little research has been done in this area to define specific data needs. However, general statements can be made.

Measures of health risk and health status are required. Both measures are critically dependent on careful integration of clinical data systems with administrative systems. Risk factors include lifestyle habits such as patterns of smoking and alcohol use as well as clinical parameters such as cholesterol levels. Health status data include measures such as bed-disability days as well as clinical parameters such as blood pressure and fitness levels. HMO data systems do not deal with these types of data today. Computerized medical records are mandatory before active use of health risk and health status measures is realistic. GHC presently employs several systems to assess risk and health status and to support preventive care protocols. For example, a comprehensive breast cancer screening system is used to assess risk and initiate periodic appointments to primary care and mammography services based on GHC's cancer care plan protocol.

Consumer satisfaction is critical; the member makes the decision to continue care with an HMO. Long-term measures of health status will be meaningless

unless the HMO administrator can maintain a reasonably stable enrollment base. Key data required to assess satisfaction include measures of access such as appointment waiting times, complaint patterns, attrition reasons, and malpractice suits. Most often, data in this area are obtained via survey techniques and may be limited. GHC routinely monitors access parameters such as appointment and telephone wait times. In addition, we systematically conduct controlled consumer opinion surveys to assess satisfaction.

Purchasers of health care need to know how effectively HMO benefit plans offered to employees are performing. Financial performance as well as quality of care and employee satisfaction are key indicators. With other factors equal, the employer relies on employee feedback to decide which plans to offer. Employer requests for actual utilization and cost data require careful statistical interpretation. Utilization seldom correlates well with risk for a given period unless based on very large populations. Consequently, purchasers and HMO managers are struggling to identify useful comparators. The Group Health Association of America is facilitating this effort between employers and HMO managers.

### **Comparative information**

The needs described previously relate primarily to the internal management of the HMO and the situation-specific needs of customers and providers. Other publics (legislative, financing, and regulatory bodies and investors) need access to overall comparative data. This need is analogous to the need for hospital industry data that is satisfied largely through data bases and summary reports of the American Hospital Association and Commission on Professional Hospital Activities.

Comparative information needs for the HMO industry are being addressed through the development of Group Health Association of America's National Comparative Database (Brudevold, English, and Reeves, 1986). This data base will contain three major data categories encompassing enrollment, utilization, and financial measures.

- Enrollment data will include such measures as source of membership, contract type, and age and sex distributions. These data will permit analysis of the effects of enrollment on operations.
- Utilization data will include such measures as inpatient services, discharges, and patient days; nonadmission services that substitute for inpatient care such as surgery centers or inhome care; and ambulatory encounter information. These data will permit comparisons with industry and area norms.
- Financial data will include such measures as capital structure and profitability data to provide insight into access to funding, rates of growth, and financial viability. Detailed distribution of expense data will provide insight into corporate strategies as they relate to the U.S. health care market.

### **Implications for HMO systems**

HMO administrator data needs dictate a sophisticated approach to the design of information systems. As the U.S. health care system evolves and traditional distinctions blur, the integration of administrative and clinical data becomes critical.

Current HMO information systems reflect simpler times. Relatively little integration exists among various applications, making it difficult or impossible to respond to both internal and external data needs. Integration, as it exists, is largely based on the need for two operational systems to communicate for routine business transactions. A simple example is the need for the claims processing application to reference eligibility and benefit data maintained by means of the membership application. Clinical systems are poorly integrated. Nonstaff HMO model types normally do not control or link to the clinical systems used by the HMO's various providers. Clinical data are kept, as in the traditional fee-for-service sector, by individual physicians and are not accessible to the HMO except by request or chart audit. The HMO relies on the "bill" submitted by the physician for needed utilization data. This is satisfactory for administrative purposes, but it is only marginally useful for clinical purposes.

HMO administrators need to require vendors and their own management information system departments to address the critical need for integrated systems. The ability to compete effectively will hinge on the degree to which information technology supports operational and strategic planning functions. This requires a data-driven systems design that tightly links marketing, membership, clinical information, claims processing, and financial functions. At GHC, a comprehensive strategic information plan is the basis of a major redesign of information systems.

### **Implications for health policy**

Managed health care systems have the potential for improving the cost effectiveness of health care. A recent survey for the Henry J. Kaiser Family Foundation by Louis Harris and Associates found that 85 percent of the business executives polled agreed that HMO's are effective in containing the cost of health care, up from 59 percent in a 1980 survey (Kosterlitz, 1985).

Recent public policy has concentrated on cost-containment strategies such as those represented in Tax Equity and Fiscal Responsibility Act legislation. For example, the diagnosis-related group prospective reimbursement mechanism focuses on discrete events of hospital care. The aggregate effect of these strategies has slowed hospital cost growth rates. In a limited sense, implementation of DRG's may represent only a shifting of costs to the less visible ambulatory arena. Proposals to apply prospective reimbursement schemes to ambulatory care using ambulatory visit groups (AVG's) are an extension of the current cost-containment strategy. AVG's may

result in subsequent cost shifts to other arenas.

Rapid membership turnover is costly, so Group Health Cooperative encourages long-term enrollment. This results in our bias toward practices that contain present costs without shifting them to later years. GHC's emerging experience suggests that lifetime health monitoring has much potential to highlight the benefit of preventive health care to the member and the employer; to discourage overemphasis by providers on event-based productivity measures; and to encourage program planning and operational decisions that effect coordinated care over time and across providers.

If Group Health Cooperative's emerging experience is indicative of the experience of other health care providers, investigating alternative data, financing, and reimbursement mechanisms that focus attention on long-term health status measures, rather than discrete events of care, may be in order.

## References

Birch & Davis Associates: *HMO Critical Performance Measures*. Contract No. 282-81-0050. Prepared for Office of Health Maintenance Organizations, 1983.

Brudevold, C., English, S., and Reeves, I. M.: *Building a National Comparative Database for Prepaid Group Practice HMO's*. Minneapolis. Group Health Institute, 1986.

Enthoven, A.: The Rand Experiment in Economical Care. *N Engl J Med* 310:1528-1530, 1985.

Kosterlitz, J.: The government, health experts, Wall Street pinning their hopes on HMO's. *National Journal* 17(47):2650-2654, 1985.

Witter, S. C., Bluhm, W. F., and Wang, A. B.: *Systems Design Considerations and the Changing HMO Environment*. Minneapolis. Group Health Institute, 1986.

## Analytic perspective on data needs of health maintenance organizations

by Mark C. Hornbrook, Merwyn R. Greenlick, and Marjorie D. Bennett

### Introduction

Information is necessary for efficient and equitable reimbursement of health maintenance organizations (HMO's) participating in Medicare. The answers to three fundamental questions are needed for each HMO: Who is receiving care? Is the payment adequate? What is being paid for? However, like any economic good, information is costly and resources used for its collection and analysis have competing uses. The aim of this article is to develop some guides

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to appropriate data collection for capitation payment of HMO's for Medicare beneficiaries.

From the perspective of the Health Care Financing Administration (HCFA), one significant consequence of enactment of the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) is that the detailed claims expense and utilization records maintained by HCFA for fee-for-service (FFS) beneficiaries and providers are no longer available for Medicare capitation enrollees. Very little information, beyond eligibility data, is being collected by HCFA on capitation beneficiaries. Hence, HCFA program management staff have little knowledge about who or what is being treated by participating HMO's.

On the other hand, from the HMO's perspective, it is significant that TEFRA frees HMO's from the need to collect costly and detailed utilization and expense data that are used solely to meet Medicare data requirements. Imposition of data specifications derived solely from FFS experience may counteract many of the gains of the TEFRA reforms. An optimal HMO data collection system would meet HCFA's need to know who and what is being paid for and what the appropriate payment level is by utilizing, insofar as possible, data that are internally useful to HMO's. To require HMO's to collect data that are not pertinent to their operations, when HCFA could equally well use data that are pertinent, is suboptimal. Inefficiencies are introduced into the administration of HMO's, thereby increasing the total cost to society of providing health care to Medicare beneficiaries. As Donabedian has suggested, HMO's carry a unique ability, and, perhaps, a social imperative, to develop nontraditional approaches to providing high quality health care at reasonable cost. He states: "Not the least among the glittering prospects that the words 'health maintenance organization' evoke is the opportunity to reshape our thinking about what constitutes quality in everyday medical practice and about how that quality might be protected, nurtured, and made to grow" (Donabedian, 1983). Medicare reimbursement should support and encourage this imperative.

Thus, we argue that it is necessary to understand the internal data requirements of HMO's, especially the ways in which they differ from the requirements of the FFS sector, before devising data reporting requirements to meet HCFA's needs. Any data requirements promulgated by HCFA ought to help HMO's perform their basic mission of curing, maintaining, and caring for Medicare beneficiaries in an effective, efficient, and equitable manner. In this presentation, we address each issue in turn.

### HMO data requirements

The essential distinction of an HMO is integration of ambulatory care, inpatient care, and risk pooling (i.e., insurance) within a single organization. For a fixed capitation payment, an HMO accepts the risk for all Part A and Part B services required by a Medicare beneficiary. Thus, capitation establishes a