

# Using Data and Provider Profiling in Medical Management

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### *Study Objectives*

- Understand general requirements for using data in medical management
- Understand basic report format requirements
- Understand basic types of reports and data for inpatient, outpatient, and ambulatory utilization
- Understand basic concepts of profiling, and the problems of profiling and approaches to dealing with those problems
- Understand the uses of data, and the strengths and weaknesses of different approaches to using data to manage medical care
- Understand the general advantages and pitfalls of case mix/risk adjustment systems
- Understand the trends in profiling and medical informatics
- Understand the use of case mix/risk adjustment measures for quality of care and for utilization/cost.
- Understand the challenges of public vs. confidential disclosure of provider information

### INTRODUCTION

Of all the activities involved in managing health care, the use of data and information for purposes of medical management, and particu-

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larly for provider profiling, continues to take on ever increasing importance. The ability of medical managers to intelligently use data and infor-

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mation to better manage the health care delivery system has been a key factor distinguishing those plans that truly excel from those plans that are, at best, adequate performers. This ability to use data and information is only expected to increase rapidly, especially as electronic commerce (e-commerce) achieves its rapid growth. Through e-commerce, more data become available, transmission of data and information becomes more rapid and more widespread (via the Internet, in particular), and demands for useful information increase in all sectors of the industry.

This is not to say that the other management activities have lesser merit. Just the opposite; the use of data allows those activities to be carried out more effectively. However, it is important to bear in mind that information is not magic. Data and information are merely powerful tools for the medical manager to carry out necessary functions.

The initial focus of many medical reporting activities has historically been inpatient care. Due to the cost of inpatient care, managing hospital utilization remains a prominent and useful part of the overall management of utilization (as discussed below and in Chapter 11). A hospital case is usually easily definable (except for transferred or readmitted ones), and the physicians delivering care are usually identifiable. Beyond basic utilization reports, basic hospital care profiling (adjusted for case mix and severity, without which the relevance of the entire discussion on hospitals is diminished) combined with feedback to physicians and active intervention has been shown to effectively reduce length of stay<sup>1</sup> and decrease exposure to potential dangers in the hospital setting, such as medication errors.<sup>2</sup>

Recent activity has shifted to consider outpatient procedural and office-based care as well, recognizing that care occurs across a continuum, rather than in isolated episodes. This is of greater interest by acquiring statistical power through meaningful sample sizes per practitioner, as more data points occur outside of the acute hospitalizations. The key question here is the unit of analysis. With respect to outpatient services, one can examine care at the individual visit level or across ambulatory visits into episodes. For each of these in-

dependent variables, there is a host of dependent variables that one can examine; they are summarized below. From a disease management perspective, ideally one would like to look across the continuum of care, but the collection of this type of data is often complex and impractical. Thus it is sometimes better to examine and act upon the parts of the episode for which data are frequently available and have a direct bearing on both quality and cost, as discussed later in this chapter.

Provider profiling as a specific topic is the focused subject of the latter portion of this chapter. Profiling means the identification, collection, collation, and analysis of data to develop provider-specific characterization of their performance. As used in this chapter, *providers* can be any type of provider of health services, including physicians, hospitals, and managed care organizations (MCOs). Done correctly, provider profiling represents an important part of quality improvement and the external documentation of the positive impact of managed care on the population.

Of particular importance in this chapter is the issue of confidentiality of data and information. While it appears obvious that confidentiality should be maintained, this requirement has escalated with the passage of the Health Insurance Portability and Accountability Act of 1996 (HIPAA). A detailed discussion of this act is provided in Chapter 34. Due to its pervasive scope, HIPAA is also referenced in several other chapters (especially Chapter 20). A summary of requirements for confidentiality and security of data that contain clinical information is provided later in this chapter. The reader is cautioned to be thoroughly familiar with these confidentiality and security requirements as they apply to the subject of data and information in medical management.

## USE OF DATA AND INFORMATION IN MEDICAL MANAGEMENT

### Data Elements and Reports: General User Needs

There are certain general requirements that must be met in order to make data more useful to end users. Raw data have no immediate value to



the typical manager. Users must be able to access usable data as directly as possible. If a manager must stand in line to supplicate the guardians of the management information systems (MIS) in order to extract critical information, opportunities will be lost. Access must be as timely, and as easy to use, as possible. The ability of managers to have considerable flexibility with data is also desirable. If a manager must accept a hard-coded report and cannot cut the data in another fashion without a lot of wasted time and coding expense, then that manager will be trapped into managing only with whatever information the programmers have permitted.

### Ability To Use System Data with Other Tools

It is important that managers be able to obtain data from the system and use those data with other analytic tools. Advanced statistical analysis programs can be useful to the medical department when performing practice profiling (discussed below) or other trend analysis, and there are several third-party software programs that require such data transfer. The ability to export or download data into other programs, such as spreadsheets or database programs in personal computers, is also desirable. The ability to securely transmit analyzed data to physicians' offices via the Internet is a feature that will rapidly gain importance with the acceleration of e-commerce.

### Format

How reports are formatted is a matter of taste (for the user, *not* for the MIS department producing the report!) and the MIS department's ability to produce the requested format. The easiest type of report for MIS to produce is one that tabulates columns of numbers. That is also usually the type most deadly to a busy manager. An already overburdened medical director has better things to do than sift through 20 pages of printout looking at raw numbers of referrals for each physician to get an idea of the referral rate. The best types of report formats for plan medical managers usually are ones that can fit onto one or two 8" x 11" sheets of paper. Those reports

should summarize the important data, indicate the outliers and deviations from the norm (or from preset standards), and indicate whether the manager will need to seek more detail. If managers need the raw data, they can always ask for them. For example, a two-page report giving the overall referral rate for the plan and the annualized referral rate for each primary care physician (PCP) for the month and the year to date may be sufficient by itself. If there are PCPs who are grossly over the norm, the medical director can then ask for the detail behind the report.

Graphic reports are useful for conveying large amounts of information quickly to busy managers. This is particularly true when one is presenting data to managers and providers who are not used to looking at reports. Unfortunately, most mainframe computer systems and even some dedicated medical management software programs are not set up to produce graphic reports, so that data must be entered (or downloaded and then imported) into a personal computer before the graphs can be produced. This is a cumbersome process and not amenable to mass production. As computers and software become more sophisticated and the use of the data warehouse (see Chapter 20) and reporting tools becomes common, production of graphic reports will also become more common.

The message here is that reports for busy managers should be concise, readable, and easily interpreted and allow the manager to request further detail as needed. One common problem is overkill with detail. Judging by the ceiling-high stacks of computer printouts, reports in some plans must be valued by weight. It is easy to believe that the more data and detail the better. When that happens, you get the classic problem of not seeing the forest for the trees, with the manager spending more time grinding through reports than managing. Computers are wonderful tools, but they can smother you with data. Know what to ask for and when to ask for it.

### Routine and Ad Hoc Reports

To manage information wisely, one needs to decide which reports will be wanted on a routine

basis and which will be ordered on an ad hoc basis. For example, in a stable open-panel plan, it is unnecessary for the medical director to receive a monthly report listing the recruiting activity or membership for each participating physician. That information, if it is needed, could be provided once per quarter. On the other hand, the medical director or associate medical director will usually want a hospital report on a daily basis.

The basic rule of thumb is to ask for routine reports for those functions that require constant management and will provide sufficient data to spot trends and aberrations. Routine reports should allow the manager to decide when to focus on specific areas for further investigation. For example, watching the trend in specialty costs could reveal an upswing that would result in a request for detail about utilization by a particular specialty. That, in turn, could lead to a need to look at utilization by individual providers in that single specialty. Save the highly detailed reports for infrequent intervals or ad hoc requests. Time spent deciphering cryptic reports is time spent not managing.

### **Making Sure One Has Clean Data**

Hospitals and MCOs receive and are repositories for many sources of data. At present, it is likely that medical groups harvesting data will have an outside group processing their data, although that could change in the future as larger medical groups internalize such functions. Such data are subject to a great deal of editing and are fraught with potential problems that can lead to poor accuracy and integrity. The old maxim of garbage in and garbage out definitely applies to the data collection and information process. The data included in a medical management report or a provider profile are only as good as the effort the physician and other members of the health care team have made in completing the required data entry. It is as easy to collect data that produce bad results as it is the opposite. Potential problems with integrity of cost and quality data include (but certainly are not limited to):

- bad data (that is, incorrect or grossly inaccurate data)

- managing physician not correctly identified
- specialist category not consistently identified
- practice does not match specialist category
- parameter is not practical to measure
- no adjustment for illness severity
- no statistical significance testing

These considerations are among the most basic in the data harvesting process. Errors are common, especially in data that require manual entry (that is, data entered via keystrokes); such errors must be prevented when possible and identified and corrected when present. In some plans, especially large, older insurance companies still depending on legacy software systems, the database may not even use all the available information.

Data must also be valid. They must actually mean what you think they mean. Even when there is great attention to diagnostic coding, the reason for the visit may or may not be related to everything that gets done (for example, a patient is seen with the diagnosis of hypertension but also gets a hearing test), or the diagnostic code may not be the same as the underlying disease (for example, a patient is seen for an upper respiratory infection, but the relevant diagnosis is emphysema). In addition to coding validity, it is important to validate data against other potential sources of the same data. For example, physician identification data may be kept in two separate databases, which may not match. It is also common for providers to have different identifiers depending on what office they are practicing in, what group they are with, and so forth. For example, a physician may work with a medical group on certain days, but have a solo practice on other days. This last problem will eventually be resolved through the introduction of the National Provider Identification Numbers (NPIs), as noted below.

The measures must be meaningful. It is of no value (other than academic) to measure things that have no real impact on the plan's ability to manage the system or a physician's ability to practice effectively. Even worse, there is potential harm in producing reports that purport to mean one thing but really mean another.

The sample size must be adequate. Measuring encounters or referral statistics by physician is of little value if a physician has only 20 members in the panel. Even large databases may fall prey to this problem if the claims and clinical data are spread over too large a provider base so that there are insufficient data for any given provider. Even when there are sufficient outpatient data for participating PCPs, there frequently are insufficient data regarding inpatient admissions to be meaningful, even in large insurance claims databases.<sup>3,4</sup>

The issue of adequate sample size is significant. The ideal sample size depends on what the information will be used for. If the information is to be released to the public, the standard has to pass a much higher test compared to internal release of information. Merging across diseases (such as hospitalizations) is almost always necessary, as it is almost never the case that a physician has sufficient patients with any one diagnosis. It is important, after one has adjusted for severity of illness (discussed below), to combine diseases at appropriate levels of severity. Thus a patient hospitalized for an acute myocardial infarction (AMI, or MI), which has a high risk of mortality, cannot be simply added with uncomplicated pneumonia patients. This represents a complex task and is done using specialized software. It is important to understand whether and how the commercial software is designed to handle severity adjustment and risk of mortality adjustment account for this issue and what algorithms are used for merging data. A similar issue exists in software packages that purport to profile across an episode of illness. Software evaluation and selection are discussed later in this chapter.

The data must encompass an adequate time period. Simple snapshots in time do not reveal the true picture. This is particularly important when looking at total health care resource consumption of patients, and even more important when trying to determine whether a provider's behavior is consistent. Analyses that encompass long periods of time need to be viewed with the knowledge that practice patterns and behavior change over time, and that must be taken into

account when comparing long time periods to short ones for the same types of episodes.

It is not unusual for data to come from multiple sources. Linking these data represents one of the biggest challenges for anyone attempting to produce useful provider profiles. A health plan may use more than one system to administer different activities (for example, enrollment and billing on one system, general ledger on another, utilization management on another, claims on still another). Some older and larger plans often use more than one system to carry out the same functions (for example, it may run two or three different claims processing systems), and some large companies use separate systems at each local plan level. Merging data from external sources such as a pharmacy benefits management company (see Chapter 15) or reference laboratory has also proven to be challenging. It is also possible that multiple plans, or a combination of a plan and a provider system, such as an integrated delivery system (IDS; see Chapter 3), will desire to combine data in order to improve the robustness of the database. In all such cases, the data must be integrated into a common database, again, facing the problems of conformance in meaning. This leads to a requirement to standardize a format for use in data analyses. The only other option when faced with multiple systems is to use only a subset of data from a single system, but that is a poor alternative.

Data must be consistent and mean the same thing from provider to provider. For example, one provider may code differently from other providers for the same procedure, and a hospital may code an event differently from the attending physician. Diagnostic coding is particularly problematic when analyzing data from physician outpatient reports. Because diagnostic coding is not important in determining what a physician is paid (except for those claims systems that match diagnostic code to procedure code), there is a great deal of laxity in diagnostic coding for office visits. Procedure coding tends to be more accurate because there is a direct relationship between what a provider codes as having been performed and what the provider gets paid (except in capitated systems). Accuracy, however,



does not rule out creative coding, common upcoding, or even fraud, resulting in deliberate coding inconsistencies. For example, one surgeon may bill for a total hysterectomy, whereas another surgeon performing the same procedure may bill for an exploratory laparotomy, removal of the uterus, removal of the ovaries, and lysis of adhesions, all of which generate a fee. The need for consistency may mean having to change or otherwise modify data to force conformance of meaning.

### PATIENT DATA CONFIDENTIALITY

There have always been requirements on providers and MCOs to protect the confidentiality of patient information. Those requirements have been variable from state to state to some degree. That has recently changed with the passage of HIPAA, which creates a stringent minimum set of privacy and security standards, though states remain free to impose even greater stringency. Privacy and confidentiality regulations are a substantial portion of HIPAA, though at the time of publication, final delineation and application of some of those regulations were still being resolved. In addition to privacy and security standards, the implementing regulations for electronic business transactions also include detailed technical specifications based on ANSI X.12 N transaction data standards for both the data fields contained in a transaction and for the electronic format for transmitting a transaction and also mandates the use of standard procedure and diagnostic codes; these are discussed in Chapter 20.

As illustrated in Exhibit 18-1, adapted from Chapter 34, HIPAA focuses on requirements to maintain the physical security of health information. The legislation applies to any person or organization that maintains or transmits electronic health information. HIPAA outlines standards for maintaining reasonable and appropriate administrative, technical, and physical safeguards. The *safeguards* aim to protect the physical security and integrity of personal health information from threats, hazards, or unauthorized uses.

HIPAA prohibits wrongful disclosures of individually identifiable health information and prescribes penalties for violations. Unlike the other parts of the administrative simplification title, however, the confidentiality provisions do not supersede all state laws about privacy of health information; a state may implement stricter, but not less strict, regulations. Table 18-1 further illustrates some of the applicable data security standards, which fall into three categories: administrative procedures, physical safeguards, and technical security issues.

HIPAA allows data to be used for medical management, including managing utilization and quality. It also allows for the use of “blinded” data—aggregate data for purposes of producing population-level reports—as long as there is no way for someone to use those data to track back to an individual patient. Special protections are provided for mental health records. There are also situations where specific permission to use the data must be obtained from the patient (for example, providing that information to an employer or to anyone that is not involved in the provision or direct management of the patient’s medical care). HIPAA expressly prohibits the sale of patient-identifiable data for any marketing or sales purpose.

At the time this is being written, the proposed regulations on privacy have been issued and are undergoing final revision, so the reader must review the final regulations and not rely on any of the summaries provided here. By starting at [www.hcfa.gov](http://www.hcfa.gov), the reader will be able to navigate to all relevant material on HIPAA, including privacy and security regulations, as well as other aspects, such as the NPI, new databanks, and so forth.

Based on the above, it is clear that the use of data for medical management purposes requires a high degree of attention to policy and procedure to protect the confidentiality of the data. Methods to produce reports must take these confidentiality requirements into account. Nevertheless, these confidentiality requirements, while creating high standards, do not prevent medical managers from using data.

**Exhibit 18-1 HIPAA Requirements Regarding Health Information**

**The health care industry business transactions set forth in HIPAA include:**

- **Health claims or equivalent encounter information**—a transaction used to submit health care claim billing information, encounter information, or both, from health care providers to health plans.
- **Health claims attachments**—a transaction used to transmit health care service information, such as subscriber, patient, demographic, diagnosis, or treatment data for the purpose of a request for review, certification, notification, or reporting the outcome of a health care services review.
- **Enrollment and disenrollment in a health plan**—a transaction used to establish communication between the sponsor of a health benefit and the health plan. It provides enrollment data, such as on the subscriber and dependents, as well as information on employers and health care providers. The “sponsor” is the backer of the coverage, benefit, or product. A sponsor can be an employer, union, government agency, association, or insurance company. The health plan refers to an entity that pays claims, administers the insurance product or benefit, or both.
- **Eligibility for a health plan**—a transaction used to inquire about the eligibility, coverage, or benefits associated with a benefit plan, employer, plan sponsor, subscriber, or a dependent under the subscriber’s policy. It also can be used to communicate information about, or changes in, eligibility, coverage, or benefits—information from sources such as insurers, sponsors, and health plans, that is sent to recipients such as physicians, hospitals, third-party administrators, and government agencies.
- **Health care payment and remittance advice**—a transaction used by a health plan to make a payment to a health care provider, to send an explanation of benefits or a remittance advice to a health care provider, or to send both payment and data to a health care provider.
- **Health plan premium payments**—a transaction used by employers, employees, unions, associations, or other entities to make and keep track of payments of health plan premiums to health insurers.
- **First report of injury**—a transaction used to report information about an injury, illness, or incident to entities interested in the information for statistical, legal, claims, and risk management purposes.
- **Health claim status**—a transaction used by health care providers and recipients of health care products or services to request from a health plan the status of a health care claim or encounter.
- **Referral certification and authorization**—a transaction used to transmit health care service referral information among health care providers, health care providers furnishing services, and health plans. It may also be used to obtain authorization for certain health care services from a health plan.

*Source:* Reprinted from “Health Insurance Reform: Standards for Electronic Transaction; National Standard Health Care Provider Identifier; Proposed Rules,” PP 25278-79. Adapted from Chapter 67, courtesy of HIAA, *Federal Register*, May 7, 1998.

## **DATA ELEMENTS AND THE APPLICATION OF REPORTS**

### **General Sources of Data**

Data elements can be drawn from a variety of sources, such as claims and encounter data from the main system, data from medical management software, and patient-derived information. Examples of common data derived from the

plan’s operational systems might include demographics, encounter rates, referral rates, admission rates, pharmaceutical use, and so forth. Clinical data are derived from sources other than the plan’s operational systems (for example, medical records abstracting); these might include outcomes data, quality data, and so forth. It is important to understand the sources of data and the limiting factors that those sources place on the utility of data in medical management.

**Table 18–1** HIPAA Data Privacy Requirement

<i>Category</i>	<i>Requirement</i>
<b>Administrative procedures</b>	<ul style="list-style-type: none"> <li>• a certification review (HHS must decide if this will be either an internal or external certification)</li> <li>• chain of trust partner agreements that signify that contractors or partners are security compliant</li> <li>• policies and procedures for processing records (including security standards)</li> <li>• access authorization, establishment, and modification policies</li> <li>• internal audit of MIS security</li> <li>• personnel authorization and security process</li> <li>• MIS security configuration management procedures</li> <li>• security incident procedures</li> <li>• security management process (includes a risk analysis, risk management, sanction policy, and a security policy)</li> <li>• termination process for internal and external users</li> <li>• security training</li> </ul>
<b>Physical safeguards</b>	<ul style="list-style-type: none"> <li>• assigned security responsibility</li> <li>• media controls over receipt and removal of hardware and software</li> <li>• physical access controls</li> <li>• workstation policies</li> <li>• secure workstations</li> <li>• security awareness training</li> </ul>
<b>Technical security issues</b>	<ul style="list-style-type: none"> <li>• access controls, including procedures for emergency access and one of the following: context-based access, role-based access, or user-based access</li> <li>• audit controls to record and examine system activity</li> <li>• authorization control over the use and disclosure of health information either by role-based access or user-based access</li> <li>• data authentication to prove data have not been altered or destroyed illegally by use of check sum, double keying, message authentication, or digital signature</li> <li>• entity authentication—verify entity is who they say they are by use of automatic logoff and unique user identification plus one of the following: biometric ID system; a password system; or a PIN, telephone call back, or a physical device system</li> </ul>

Courtesy of Ernst & Young LLP, 2000, Washington, DC.

Specifically regarding profiling, the following data elements are generally necessary:

- Unique patient identifier (scrambled for patient confidentiality)
- Diagnostic information—typically provided using codes from the International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM), which will soon be replaced by ICD-10
- Procedural information—derived from volume III of ICD-9-CM, current procedural terminology (CPT) and HCFA Common Procedure Coding System (HCPCS) codes. In addition, identifying information relative to the name of the pharmaceutical used is often present.
- Level of service information—such as that provided by evaluation and management CPT codes



- Charges from services ordered by the physician or health care facility
- Results of information derived from additional studies—such as patient satisfaction and measurement of patient health status.
- Unique provider identifier. Universal Provider Identification Numbers (UPIN) codes for physicians, as used by the Health Care Financing Administration (HCFA), are not necessarily unique. The UPIN code will be replaced by a new numbering convention, the NPI in 2002 (2003 for smaller health plans and payer organizations), though that time line could slip. The new NPI is discussed in Chapter 20.

Expanding the provider profile to encompass episodes of illness is an important development in this discipline. This is a complex undertaking from every perspective, but two issues in particular merit emphasis. In this case, there is an absolute need for a valid patient identifier that will allow linkage of various outpatient and inpatient encounters; and a master member index (MMI) that identifies in a reliable manner each patient receiving care from a particular physician. To put it simply, such an MMI would be able to ferret out whether or not John Smith is the same individual as John D. Smith. The MMI issue is a significant one for capitated medical groups, as they often do not have access to a complete listing of all their covered members, or they have this information in a format that is not useable for analytic purposes (for example, a paper printout of members). As noted earlier, such patient identifiers and a MMI must conform to security and privacy requirements.

Especially when one is looking at quality of care, the data elements chosen for a profile need to be clinically and scientifically acceptable. To quote a recent Massachusetts Medical Society report on physician profiling, the data elements chosen need to have:

- content validity
- face validity
- **clinical practicality**
- consensus validity
- demonstrated safety and effectiveness

- transportability
- an updating process<sup>5</sup>

### **Claims-Based Data**

With respect to the much maligned claims data, there is substantial experience with the use of inpatient claims data for physician and institutional profiling.<sup>6</sup> There are several advantages to the use of inpatient claims data for quality improvement and utilization management purposes:

- With the implementation of diagnosis-related groups (DRGs), there is an extended period of experience with inpatient coding.<sup>7</sup>
- As there are significant financial issues at stake for the hospital, there typically is a considerable effort to code as accurately as possible.<sup>8</sup>
- For enrollees with a chronic illness—individuals with the highest likelihood of interaction with the health care system—information pertaining to the quality of hospital care is likely to be important. This has become all the more important with the recent decision by HCFA to use inpatient diagnoses as the initial risk adjuster for capitation rates (see Chapter 30 on Medicare managed care).
- Most simplistically, a significant portion of a managed care plan's expenditures comes from a relatively small number of enrollees.
- For at least one important aspect of quality within a hospital, mortality, the information is reliably coded and is of great importance to all consumers interested in physician profiles. Mortality, though, represents a very small set of events, and morbidity must also be measured.
- For many physicians, there are an insufficient number of patients for whom one can examine issues pertaining to either quality and or utilization.<sup>9</sup> When that is not possible, there are statistical methods to aggregate clinically dissimilar patients into categories, which have been adjusted for complexity.

While still sometimes criticized, claims-based data have been widely used for quality improvement purposes.<sup>10</sup> The Maine Medical Assess-

ment Project has extensively utilized inpatient claims data for the purpose of developing physician-specific profiles.<sup>11</sup> These profiles are then released directly to the physician. This project has had a significant impact on medical practice, not only because of the rigorous scientific nature of data elements used within the physician profiles but, just as importantly, the release process of the profiles. That is, the physician profiles are not only released for internal purposes only, but senior physicians have provided extensive follow-up to the physicians involved in this profile effort.

Controversy still exists with respect to the validity of using claims-based data for quality improvement purposes. Recently published literature has begun to address this controversy, which has until now consisted more of noise than understanding. Chen and colleagues at Yale University determined that at least one methodology—that used in the creation of the *U.S. News and World Report Quality Ranking*—correlated with outcomes and processes of care for the one condition examined, AMI.<sup>12</sup> On the other hand, Iezzoni and colleagues also determined that complication rates derived from claims data do not correlate with quality of care information abstracted from the medical record.<sup>13</sup> MCOs should be cognizant of the inadequacy of hospital complication rates that rely on claims data. Several entities, such as the state of California, are working to improve the validity of claims data by collecting data that indicate whether or not a secondary diagnosis was present on admission.

With respect to visit-based ambulatory care claims data, profiling can provide information pertaining to utilization of services (provided that procedures are not a significant part of the case mix adjustment that is used to account for differences in illness severity of the patient).<sup>14</sup> So long as the objective is clearly specified, profiling can also provide information pertaining to quality of care provided to enrollees. Thus the following types of information obtained from visit-based ambulatory claims data are useful for physician profiles for quality monitoring purposes:

- presence or absence of a particular procedure (such as a vaccination or mammogram for preventive services or a retina examination for a diabetic patient), the performance of which typically indicates that quality care has been provided for that particular condition
- utilization of inappropriate site of care (such as the emergency department for an asthmatic), which, if repeated continuously, may indicate an opportunity for improvement.<sup>15</sup>

According to a recent review of claims data used for physician report cards: “Despite their imperfections, claims data can be extremely useful probes to improve utilization, target continuing medical education, help manage complex patients, identify underserved patients and detect misprescribing, as well as fraud and abuse.”<sup>16</sup> The author goes on to indicate that there is little training available for physicians to accurately and reliably code with ICD-9-CM and CPT-4. While training programs are important, accurate coding will emerge only when physicians have an incentive to code accurately. For example, one of the authors of this chapter has seen a marked increase in physician interest in accurate coding when the physicians are committed to and trusting of inpatient risk adjustment methodologies that a hospital, together with physician input, has decided to use for profiling purposes.

Relatively speaking, we remain at a primitive state of physician profiling, depending on claims data for episodes of illness. Yet, significant enhancements are currently available in the market (as discussed below under severity of illness for episodes), including the development of severity-adjusted disease-specific categories that:

- could be tracked over an episode of illness<sup>17</sup>
- begin at hospitalization (such as a myocardial infarction) and track mortality over a 90-day period of time
- identify procedure codes, which may represent a complication of care (for example, in a recently published paper, the Center for Health Economics Research identified the performance of a computerized tomography scan shortly after discharge for an en-

arterectomy as a possible indicator of a complication of care)<sup>18</sup>

### Encounter-Based Data

The common use of the term *encounter* refers to an office visit and may be used by a health plan to describe patient visits in a capitated system in which no claim is generated; in some MCOs this is referred to, and treated as, a “no-pay” claim. This would appear, then, to be similar or identical to the use of claims data, but it is not. In a capitated system, there is less motivation to report the visit since it has no impact on reimbursement. A physician or medical group may choose to track those visits for its own internal management but may or may not make those data available to the health plan (or they may exist in a format unusable by the plan). Therefore, one must be cautious when equating encounter numbers in a capitated system to claims in a fee-for-service system.

### Medical Records-Based Data

Medical records-based data include any information drawn from the medical record and any other pieces of paper or data files completed by a provider at the time of an encounter with a patient. Medical records-based information is data derived from encounters between the patient and the health care system. Typically, medical records-based data are derived from the MCO’s medical management system or from data abstracted from

the office or hospital medical record into a health data management tool. Some examples of this type of information might include:

- conformance with clinical care algorithms
- diagnostic and therapeutic resource use
- hospital nosocomial rates
- transfusion errors

### Member Questionnaires

Two general types of information are typically drawn from enrollees: satisfaction and health status.<sup>19</sup> Exhibit 18–2 provides examples of different types of information drawn from enrollees. One of the authors of this chapter was involved in the development and use of a patient satisfaction questionnaire in a large staff model health maintenance organization (HMO). The results of this questionnaire were used as part of the salary increase for the staff model physicians. Of significant importance, the physicians themselves were involved in the development of the questionnaire. Many MCOs are using results of patient-derived information in their quality bonus plans. From a cost point of view, it should be emphasized that patient satisfaction questionnaires do not require large numbers of enrollees to produce statistically valid information.<sup>20</sup>

When using member surveys, there are several issues to bear in mind. The survey must be carried out with these principles:

**Exhibit 18–2** Differences between Ratings and Reports of Health and Health Care

	Ratings	Reports
Health	Rating of physical shape or condition (Excellent . . . Poor)	Able to participate in sports, strenuous activities (Yes/No)
Health Care	Rating of quality of doctors (Excellent . . . Poor)	Side effects of medication discussed? (Yes/No)

Source: Adapted from N. Goldfield and D. Nash, eds., *Providing Quality Care: The Challenge to Clinicians*, © 1989, American College of Physicians.



- **Conducting the survey to measure an outcome:** health status, enrollee satisfaction with health care received, or other summary assessments
- **Establishing a baseline:** that is, the survey will be readministered in the future
- **Defining needs:** defining the gap between the ideal and current states
- **Collecting data on actual experiences:** for example, reports of actual waiting times for appointments
- **Collecting evaluations:** for example, ratings of satisfaction with waiting times for appointments
- **Measuring against established standards:** for example, are such goals as “patients will see a specialist within five days of being referred” being achieved?<sup>21</sup>

The last few years has seen the development of a large number of well-validated questionnaires that measure a patient’s health status.<sup>22</sup> The Foundation for Accountability (FACT), the National Committee for Quality Assurance (NCQA), and Joint Commission on Accreditation of Healthcare Organizations (Joint Commission), emphasize improving all three aspects of quality (structure, process, and outcomes).<sup>23</sup> See Chapter 26 for a discussion of these accreditation agencies.

### ***Incorporation of Other Data***

Many MCOs incorporate other data into a provider profile analysis. Claims and encounter data are important, as are data from hospital episodes, but there are additional sources of data as well. Credentialing data may be automated and referenced. Data from member services, such as complaints, transfer rates, or administrative problems, may be incorporated. As noted earlier, data from the quality management program (see Chapter 17) and member satisfaction are now included in the profiling reports and even compensation programs of advanced MCOs. ***Examples of supplemental data incorporation include, but are not limited to:***

- **Clinical measures or data, such as:**
  - condition-specific functional status measures

- laboratory or imaging result (that is, not only the blood sugar or hemoglobin A1C CPT-4 code, but the numeric result of the lab test compared to a desired level)

- measures specific to Medicare and Medicaid.

- **Nonclinical measures or data, such as:**

- designation of the imputed PCP (that is, for networks in which PCP assignment is not required, advanced profilers deduce by resource consumption pattern which provider is the PCP)

- compliance with administrative priorities (for example, being able to communicate electronically with the MCO)

### ***Publicly Available Hospital Data***

For trends (where time is not critical) and assessment of validity of internally derived data, MCOs may want to order state data tapes containing hospital claims data. There are nearly 20 states that produce these data tapes. Most of them use severity adjustment, thus increasing the value and validity of the tape. Less detailed information is also available at the federal level, and general data may also be purchased, but these have more limited applicability for management purposes.

### ***Data Warehousing***

The concept of a data warehouse is discussed in Chapter 20. Briefly, a data warehouse is a collection of a broad set of data spanning a significant period of time, as well as a repository of information derived from those data. For example, a data warehouse would be used to collect and store data relevant to physician practice profiling, both raw data as well as information generated by subjecting those raw data to appropriate modification and the creation of computer-generated data sets. This allows for faster and less expensive access to data by whatever analytic systems a plan or medical group is using to generate medical management information. If the organization must run tapes or files for the myriad sources of data (for example, claims tapes, pharmacy tapes, eligibility files, provider files, and so forth) each time they want to per-

form an analysis, the cost, computer processing unit cycle use, and time lag all become barriers to use. Lack of a data warehouse also sharply reduces the ability to create ad hoc or specialized and focused reports. By being able to access the data in a data warehouse, efficiency is vastly improved and use of the data becomes more practical. The advantages of using a data warehouse have even been extolled in the popular media.<sup>24</sup>

## GENERAL TYPES OF REPORTS

### Plan Average

Plan average simply looks at the average performance for the entire plan. It is useful in that it will relate closely to the plan's financial performance. For example, if the plan is over budget in medical expense, a plan average report that reveals hospital admissions to be greatly over budget will allow management to focus on that first. It also allows for comparative data between plans that may have somewhat different types of arrangements for the delivery of care.

Plan average is limited because it is relatively insensitive to specific causes of problems. However, that can be an advantage in some circumstances. In plans that manage by trying to keep performance clustered around a norm, that norm can sometimes be one of mediocrity. If the plan average reports and the provider-specific reports tie closely (that is, there are no real outliers in performance), and if the plan is not doing as well as it should, then it is clear that there is a general problem, not a problem with a few recalcitrant providers or hospitals.

Plan average reports are frequently required by regulatory agencies and are also useful for reporting the overall performance of the plan to participating physicians, corporate owners of a health plan, or investors (in the case of for-profit plans) and the public. Plan average reports also function as the backdrop against which other reports are viewed. A plan with multiple lines of business, such as commercial, Medicare, and Medicaid, will likely create additional plan average reports that focus on each line of business: health centers, independent practice associations (IPAs), physician-hospital organizations (PHOs), management ser-

vice organizations (MSOs), or geographically related centers.

The purpose of this focus is to provide mid-level or local managers with data for their own areas of responsibility. In many plans, especially large or geographically diverse ones, it is common to divide up responsibility into manageable units. The span of control in large or diverse plans can be a real problem. In closed panels, this often refers to a health center or a small number of geographically related health centers. In open panels, this usually refers to discrete multiple IPAs; subunits within the overall health plan, such as pools of physicians (POPs); or geographically divided territories. In plans that contract with IDSs, PHOs, or MSOs, it will be important to develop reports focused on each individual IDS.

### Individual Physician

Most managed care plans produce physician profiles that focus on individual physicians. This may refer to PCPs who are functioning as gatekeepers or care coordinators, but may apply equally to open access HMOs, specialty physicians, or preferred provider organizations (PPOs). Virtually all the types of utilization reports discussed later in this chapter are amenable to focusing on individual physicians. Mentioned only briefly here, profiling is discussed in detail later in this chapter.

Physicians become understandably concerned about the plethora of reports that are produced about them. They feel that they are being judged by machines or by standards that fail to take into account any extenuating circumstances and that their fate will be decided on the basis of sterile reports. Realistically, the ability to report the behavior of individual physicians not only provides medical managers with a powerful tool, but it also provides physicians with a great source of both concern and potential help.

Special care must be taken when one is using physician-specific reports. The medical director must look behind the data of the report for the reasons for the reported performance. This is not to say that any behavior should be rationalized,

and physicians are as adept as anyone in arguing that they are different and should not be held to the same standards as everyone else. Rather, this is to say that individual physician performance reports need to be used with attention to measures of statistical confidence and as a starting point in physician behavior change discussions.

### **Premium Source Group**

These reports track utilization and other data by enrolled group. They most frequently apply to individual commercial groups (for example, Wendy's Wonderful World o' Widgets, Inc.), but can also apply to any group of enrollees whose premiums come from a common source (for example, Medicare or Medicaid). For those plans that use experience premium rating (see Chapter 29), this will be necessary to develop the actual cost experience. Even for those benefits plans that must be community rated, or for governmental (and nonnegotiable) rates, these data will tell you whether you have a problem with that group that may need to be addressed. Also, some large employers are demanding such data as a requisite for offering your plan to their employees. In the case of Medicare risk plans, reporting Health Plan Employer Data and Information Set (HEDIS) is mandatory, as well as compliance with Medicare's Quality Improvement System for Managed Care. The HEDIS data set is discussed in Chapters 20 and 26.

### **Hospital Reports**

Routine hospital utilization management reports may be divided into two categories: the daily log and monthly summaries. Many plans now automate their utilization management systems. In addition to producing reports as discussed below, these systems allow for on-line access to far more information than would be practical on a printed report.

#### ***Daily Log***

For optimal management of utilization, it is almost a requirement for a managed care plan to produce a daily hospital log. This document serves as a working tool for the utilization man-

agement nurse and the medical director in managing institutional utilization. Its design should be directed toward providing the necessary information to actively manage cases that are current or prospective. Data should be able to be sorted by whatever management criteria make sense. For example, each hospital's census is reported separately so that the utilization review nurse can use it when making hospital rounds, or the log may be sorted by geographic region, IPA, IDS, or health center for regional medical directors to use. Example elements of a useful daily hospital log are illustrated in Exhibit 18-3.

#### ***Monthly Summary***

A monthly summary report of hospital utilization should also be produced. This differs somewhat from the daily log because it is used to identify patterns for overall management rather than to serve as a mechanism for performing concurrent utilization review. A monthly report might include the data illustrated in Exhibit 18-4 for both the month ended and the year to date.

#### ***Specialty-Focused Hospital-Based Reports***

Any or all of the above reports can be created so that they focus on physicians of a single specialty for hospital-based care. A common example is cardiovascular surgery, but the concept applies to other specialties as well. In general, this has the most utility when medical managers are focusing on that particular specialty for contracting issues, quality issues, or cost issues.

Several medical specialty societies (e.g., urology, cardiovascular surgery) have also ventured into the field of physician profiles for specific hospital-based surgical procedures. Unfortunately, many of these efforts are proprietary and the developers have not opened the logic for scrutiny by independent researchers. While it is thus difficult at the present time to evaluate the reliability and validity of these medical specialty society efforts, it is likely that such efforts will increase in importance. If the members of a specialty society are supportive of such efforts, it is likely that, over time and after considerable internal development, these physician profiles will be publicly released.



**Exhibit 18-3** Daily Hospital Log Elements**Minimum Data Elements**

- Current census
  - name of hospital
  - hospital
  - diagnosis and procedures
  - PCP
  - admitting physician
  - consultants or specialists
  - admission date
  - length of stay to date
  - free text narrative with clinical information
  - in-network compared to out-of-network status
- Hospital statistics
  - days per 1,000 today
  - days per 1,000 month to date
- Prospective admits and outpatient surgeries

**Additional Useful Data Elements**

- Service type (as part of current census)
  - medicine
  - surgery
  - pediatrics
  - gynecologic surgery
  - obstetrics
  - mental health
  - chemical dependency
  - intensive care unit/cardiac care unit
  - neonatal intensive care unit
  - rehabilitation
  - outpatient surgery
- Estimated length of stay or maximum length of stay
- Admissions and discharges today and month to date
- Authorization or denial status
- Catastrophic case report
- Line of business code
  - commercial
  - Medicare
  - Medicaid
  - self-insured versus fully insured
  - special accounts

**Outpatient Utilization**

Although daily reports are generally necessary for managing hospital utilization, in only the most tightly managed health plans or IDs will that be done for managing referral or outpa-

**Exhibit 18-4** Sample Data Elements for a Monthly Summary of Hospital Utilization\*

- Plan statistics
  - days per 1,000
  - admissions per 1,000
  - average length of stay
  - average per diem cost
  - average per case (per admission) cost
  - emergency department visits and average cost
- Hospital- and provider-specific statistics
  - days per 1,000
  - admissions per 1,000
  - average length of stay
  - average per diem cost
  - average per case (per admission) cost
  - emergency department visits and average cost
- Statistics by service type (see Exhibit 16-2)
  - days per 1,000
  - admissions per 1,000
  - average length of stay
  - average per diem cost
  - average per case (per admission) cost
- Retrospective authorizations
- Pended cases for review
- In-network compared to out-of-network statistics
- Number and percentage of denied days

\*The plan will want to produce these statistics not only for the entire plan, but for major lines of business as well (that is, commercial, Medicare, Medicaid, self-insured versus fully insured, and so forth).

tient utilization. Practically speaking, referral and outpatient utilization management is best done by using monthly reports, both routine and ad hoc. Reports should include data both for the month ended and for the year to date. Data may also be reported by month on a 12-month rolling basis. Data for such reports might include elements as illustrated in Exhibit 18-5, depending on the needs of medical management.

Categories of outpatient or ambulatory care may be divided into several components, each with its own unique characteristics. The office visit for primary care, including any testing or procedures, is one such category, as is the related category of the office visit for specialty care. Ambu-

**Exhibit 18-5** Sample Data for a Monthly Summary of Outpatient Utilization\*

- **Primary care encounter rates**
  - visits per 1,000 members per year
  - visits per member per year (annualized)
  - percentage of new visits
  - revisit interval rates (to look for churning)
- **Preventive care**—use HEDIS data
- **Laboratory/pathology utilization per visit**
- **Radiology utilization per visit**
  - total
  - focused (for example, magnetic resonance imaging)
- **Prescriptions**
  - prescriptions per visit or prescriptions per member per year
  - average cost per prescription
  - percentage generic
  - formulary compliance
- **Referral utilization**
  - referral rate per 100 primary care visits or per 1,000 members per year
  - comparison of PCP referral rate to peer group
  - initial referrals only compared to total referral visits
  - cost per referral by PCP, plan average, and specialty
  - number of visits and cost by specialty
    - top specialty referrals for each PCP
    - average cost per visit
    - per member per month cost by specialty
- **Out-of-network specialty care in POS plans**
  - percentage of total specialty care
  - cost
  - specialty and utilization categories
- **Ambulatory procedures**
  - by ambulatory patient groups
  - by ambulatory care groups and ambulatory diagnosis groups
  - by diagnostic or procedure code
- **Ancillary care**
  - physical therapy and other rehabilitation therapies
  - podiatry
  - eye care
  - oral surgery
  - other
- **Other HEDIS ambulatory reports**

\*The plan will want to produce these statistics not only for the entire plan, but for major lines of business as well (that is, commercial, Medicare, Medicaid, self-insured versus fully insured, and so forth).

latory procedures are a different matter, as is the setting for the procedure. The identical procedure may be performed in a physician's office, an ambulatory care center, or the outpatient department of a hospital. Some plans have addressed the issue of ambulatory care, especially outpatient procedures, by using statistical groupings.

As has been mentioned earlier, these types of reports are usually used on an ad hoc basis. For example, if total expenses for cardiology appear to be high, medical managers could investigate further by requesting reports that show who is ordering the referrals, what ancillary testing is being done, who the specialists are that are see-

ing the patients, how much they are charging, and so forth.

### Open Access Plans

Open access systems, or systems that do not use a primary care gatekeeper model, present special problems in monitoring utilization. In a PPO (see also Chapter 2) or managed indemnity plan, there will be no physician-specific membership base to use as a denominator. In HMOs that allow open access to specialists or allow specialists to self-authorize revisits or secondarily to authorize referrals to other specialists,

one cannot measure specialist utilization against a fixed membership base associated with particular PCPs. Some open access HMOs do indeed capitate specialists or employ contact capitation (see Chapter 8), which creates the appearance of a fixed membership base, but that is not common at this time.

In these situations, one must use both less precise methods of measuring utilization of referral services and specialist utilization (for example, specialist visits or procedures per 1,000 members), and more advanced physician profiling, as discussed below. Reports should focus on those areas under control of the specialist, as well as primary care. Examples of typical data elements are illustrated in Exhibit 18-6. These data are not considered advanced physician profiling and can only be used in general terms. In order to make an open access plan perform well, it is necessary to use the more sophisticated profiling methods discussed in the rest of this chapter.

## PROVIDER PROFILING

Provider or practice profiles have a variety of uses. Examples include producing feedback reports to help the providers modify their own behavior, recruiting providers into the network, and choosing which providers are not the right fit with the organization's managed care philosophy and goals (whether the organization is an organized medical group, MCO, IDS, POP, or IPA; the term *MCO* will be used to refer to any and all of these types of organizations). Other uses include supporting performance-based reimbursement systems, determining specialists to whom the MCO will send certain types of cases, detecting fraud and abuse, determining how to focus the utilization management program, supporting quality management, and performing financial modeling.

With respect to quality improvement, there are two types of variables one can profile: those that have a direct relation to costs and those that, while over the long term will possibly lead to decreased costs, have a closer relationship to our traditional *understanding of quality*. An example of the first type would be the variation in use of coronary ar-

**Exhibit 18-6** Sample Data for an Open Access Model Plan

### Outpatient Services

- average number of visits per member per year
- average number of visits per member per year to each specialty
- diagnostic utilization per visit
  - laboratory
  - radiology and imaging
  - other
- average cost per visit
- procedures per 1,000 visits per year (annualized)
  - aggregate
  - by procedure for top 10, by specialty type
  - by individual specialist
- average cost per episode (as defined for each sentinel diagnosis) over a defined time period, including charges not directly billed by provider

### Inpatient Services

- average total cost per case, including charges not billed by provider, for hospitalized cases
- average length of stay for defined procedures
- average rate of performance of a procedure, such as:
  - Caesarean section rate
  - hysterectomy rate
  - transurethral prostatectomy rate
  - cardiac procedures
- readmission rate or complication rate
- use of resources before and after the hospitalization

tery bypass graft (CABG) for patients with angina, while mammography rates represent an example of the second category. From a quality of care perspective, both types of variables are of equal value, and both should be used.

Unfortunately, so many meaningless profiles have been developed that physicians have become understandably suspicious of their intent. That is, rather than integrating quality with efficiency, many provider profiles today are simply economic reports. Profile implementation fo-



cused on quality improvement is always challenging, but is necessary to combine that with profiles that focus on economic issues.

Also bear in mind that one cannot simply hand out the profile and expect change to occur. While there are some reports in the literature stating that simply disseminating profile reports results in change, there is more evidence that profile reports, as important and powerful as they are, are but one tool out of several when working with physicians to examine and change practice patterns and habits. This topic is discussed further in Chapter 19.

When designing provider profiling reports, the following principles should be kept in mind:

- identify high volume and costly clinical areas to profile
- involve appropriate internal and external customers in the development and implementation of the profile
- involve the providers in the development and implementation of the profile
- compare results with published performance (external versus internal norms)
- report performance using a uniform clinical data set
- when possible, employ an external data source for independent validation of the provider's data
- consider on-site verification of data from the provider's information system
- present comparative performance using clinically relevant risk stratification
- require measures of statistical significance
- revise performance measurements using formal severity adjustment instruments

These principles will be explored further in this chapter.

### Customers and Users of Provider Profiles

There are many customers or users of provider profiles. Identification of these customers and paying attention to their needs when developing and implementing the profile are important to success. Profiles are not inexpensive in both time and money. Profile customers include:

- **Managed care organizations:** All levels (provider relations, medical directors, and so on).
- **Enrollees:** While enrollees are the ultimate customer, we are still in the process of developing profiles and approaches to their effective dissemination to enrollees.<sup>25</sup>
- **Employers:** With notable exceptions, most employers are still less interested in quality than they are in cost control. Thus the hook to get employers interested in quality is the use of tools and approaches that integrate cost control with quality.
- **Providers:** Perhaps, for today, providers are the most important customer of all. Most providers are interested in change if methods to measure performance are well grounded in scientific evidence or professional consensus.<sup>26</sup>

### Public versus Internal Disclosure of Provider Profiles

A key flashpoint of debate is internal versus external disclosure of provider profiles. By way of example, there are nearly 20 states that produce publicly available profiles of hospital services. MCOs are beginning to use this information in their feedback loop to hospitals. The report format itself is an important aspect of the development process. For example, the state of Florida, which has released hospital-specific mortality and severity of illness rates for several years, has established wide confidence intervals and designed a format that places a great emphasis on information and deliberately underemphasizes identification of poor or excellent performers. This approach improves the acceptance and utility of the report, while lowering the potential for sensationalism. Pennsylvania has undertaken similar efforts in producing reports on hospitals, taking into account severity adjustments. See Exhibit 18-7 for a generic sample of such a report.

There is at least one major difference in the characteristics desired of physician profiles when used for internal purposes (for example, private and confidential to the physician) versus

## Exhibit 18-7 Hospital Comparative Report

Hospital	Total Discharges	Average Charges		Average Length of Stay		Mortality	
		Observed	Expected	Observed	Expected	Observed	Expected
A	1,061	8,000	8,700	4.26	4.64	2.73%	3.51%
B	870	10,300	9,600	4.35	4.63	3.22%	2.92%
C	1,663	9,300	9,700	4	5	3.61%	4.17%
D	593	10,900	9,300	4.91	4.76	3.20%	4.27%

Source: Reprinted from 1996 Guide to Hospitals in Florida, Agency for Healthcare Administration, State of Florida.

when used for external purposes: the threshold of statistical and clinical validity. The threshold does not need to be as high when, for example, physician profiles are used for internal quality improvement activities.

Physicians have a legitimate concern when they assert that external release of their profiles needs to be held to a higher standard. While public disclosure of comparative information is well established for MCOs and hospitals, there is little experience with public release of physician-specific information. There is a large difference between releasing information pertaining to a hospital with thousands of employees and a high number of measurable events, and releasing information pertaining to one physician or a small group of physicians. Yet physicians cannot burrow their heads into the sand and simply claim that currently available information is not scientifically valid. That position is not only inadequate in today's marketplace of ideas, but it denies consumers information that would allow them to make better choices and better manage their own care.

The NCQA uses HEDIS information to evaluate MCOs and makes this information available through its *Quality Compass* publication. The Pacific Business Group on Health has also made an effort to use this HEDIS data set to evaluate medical groups that contract with MCOs and plans to release this information to the public.<sup>27</sup> There are also several Internet websites that provide information from multiple sources, ranking MCOs, hospitals, and physicians.<sup>28</sup>

More recently, there have been some health plans and employers that have produced and released physician practice quality and service profiles to their members or employees and have reported a shifting in enrollment into practices that were reported as "best practices."<sup>29</sup> This is a significant step forward in the development of physician profiles for external or public release. Its importance derives from the fact that many physicians, particularly on the West Coast, are not solo practitioners or members of small medical groups; they are members of large medical groups that contract with HMOs for the entire risk and are the key providers of medical care.

#### DESIRED CHARACTERISTICS OF PROVIDER PROFILES

Provider profiles should share these characteristics, as discussed below:

- accurately identify the provider in the profile
- accurately identify the specialty of the provider
- help to improve the process and outcome of care, both dollar and quality outcomes
- have a firm basis in scientific literature and professional consensus
- meet certain statistical thresholds of validity and reliability
- compare the provider to a norm
- cost the minimum amount possible to produce

- respect patient confidentiality and, if obtaining information from the medical record or using patient-derived information, obtain patient consent

### Accurate Identification of the Provider

As noted earlier, the accurate identification of the provider is not always easy or straightforward. Problems of multiple databases, the use of multiple identifiers, inconsistent data, poor linkages between provider codes and clinical information, and so forth make this a challenge. At present, the use of the NPI will address this issue in future years, but will not even begin until 2002 at the earliest. Unless an MCO uses a single master provider identification file, and has taken great care to ensure nonduplication of provider identification data, it will require a significant amount of attention to address this. In addition, profiling software must employ algorithms to ensure that data about cost, utilization, and quality are linked to the appropriate provider(s).

There are increased efforts to link hospital and physician payment for services provided in the hospital, since these data are usually not coming from the same sources. In other words, physician claims or encounters are entered into the system via both claims and the medical management system, while hospital data are likewise entered, but independently from the physician data. And none of these sets of data are automatically linked in most information systems.

In hospital care, accurate identification of the "responsible" physician is not always clear. For example, the physician of "record" for hospital administrative purposes may not be the same as the physician who actually cares for the patient. For MCOs engaging in, for example, capitation for the entire hospital portion of care, it is necessary for them to work with the hospital and its affiliated physicians (both hospitalists [see Chapter 11] and independent practitioners) to establish clear procedures on this thorny question. While it may not be immediately clear to MCOs why they need to get involved in this level of detail, without a clear understanding of this issue accurate profiles for hospitalization care will be impossible. In addition, several

MCOs are now able to provide profiles of hospitalizations for a procedure (CABG, for example) that includes 90 days postdischarge. These are much more valuable profiles from both a cost and quality perspective.

An additional problem concerns providers who behave as though they are in a group but are not legally connected and do not appear as a group in the MCO's provider file. An example would be two physicians who share an office, share after-hours on-call responsibilities, and see each other's patients, but who are actually independent of each other. The reason that this is important in managed care is that, if the MCO contracts with one but not the other, the member may wind up seeing the nonparticipating physician and be subject to balance billing. Even if the physicians agree not to balance bill, the MCO still may not actually want the other physician in the network, even on an occasional basis. Related to the above is the ability to detect linkages between practices or ancillary services. Examples include orthopedists who own physical therapy practices or neurologists who have a proprietary interest in a magnetic resonance imaging center.

### Accurate Identification of the Specialty Type

The specialty of the physician is not always clear. Most MCOs have provider files that indicate what specialty type a physician has self-indicated, but it is surprising how often that information does not match up with specialty indicators in the claims file. Of course, MCOs that perform comprehensive verification of board specialty status as part of the credentialing process (see Chapter 6) will have more accurate data than MCOs that depend on self-reporting by physicians. Ironically, the creation of the NPI will exacerbate this problem, since by (HIPAA) definition the NPI will contain no inbedded intelligence, such as specialty-specific indicators.

The problem of provider specialty definition is particularly acute when looking at primary care. Many board-certified medical specialists actually spend a considerable amount of time performing primary care, whereas others spend the majority of their time practicing true spe-



cialty medicine. This has great implications for how an MCO will evaluate performance of specialists as well as PCPs when comparisons to peers are used (a common practice). A related issue is determining which physicians will be considered specialists at all because the MCO may not want to send referrals to a specialist who is not particularly active in his or her designated specialty. Even within a single specialty there will be differences in how "specialized" a specialist is. For example, a specialist may have a majority of primary care patients or may not care for patients in the intensive care unit (ICU). Therefore, the MCO or IDS will want to look at the degree to which a physician is truly a specialist in his or her mix of routine and complex cases.

Even when the issue of specialty definition is resolved, there remains the problem that no two practices are exactly alike. As an example, some general internists perform flexible sigmoidoscopies and some do not. If one looks only at charge patterns, the internist who performs the procedure will look more expensive compared to the internist who does not, but that analysis will fail to pick up the fact that the internist who does not perform flexible sigmoidoscopies instead refers them all to a gastroenterologist who charges more than the first internist (in addition, the first internist could be overutilizing the procedure or the second internist could be failing to provide this common preventive care activity, but those are separate types of analysis). The same problem arises outside of primary care medicine. For example, when neurosurgeons are assumed to be a homogeneous group, accurate profiling cannot be done when one neurosurgeon works only on atrioventricular (AV) malformations, another on brain tumors, and so on. This problem extends to related procedures, such as whether neurosurgeons or vascular surgeons perform carotid endarterectomies or whether neurosurgeons or orthopaedists perform various types of spine fusions.

### Improve Process and Outcome Using Scientific Criteria

It is important to not only be certain that quality of care variables have relevance for either process or outcomes of care, but that there also

be scientific and professional consensus that the variables are worth examining. Generally speaking, this can be done in one of four ways:

- Accrediting organizations, such as NCQA, have increasingly put their screening items through a rigorous evaluation process.
- There are several proprietary software packages from reputable developers that include guidelines or quality of care criteria.
- Most will use professional literature, including peer-reviewed journals or trusted locations on the Internet, such as the website hosted by the Agency for Health Care Policy and Research, *www.guideline.gov*.
- Self-development is always an option, but development of reliable and valid quality of care criteria always takes more time than one expects.

### Need for Statistics

Appropriate statistical techniques are required for both quality of care and efficiency criteria. Without their use, one can easily be misled by noise into arriving at a mistaken conclusion. Most stand-alone software packages have statistical tests embedded. If one is obtaining reports from the MIS department, it is important to ask for the addition of statistical tests, especially when faced with decisions pertaining to network determination. Reports should include basic measures of confidence, such as standard deviations or *p* values.

From a design point of view, it is likely that there will be enough data over time to profile a provider using statistical process control (SPC). "SPC consists of a set of powerful techniques to ensure the continued stability of any process and to detect the presence of sources of instability."<sup>30</sup> One can develop control charts or simpler reports if one is not able to use SPC for a wide variety of independent variables using claims data such as:

- daily hospital log
- length of stay
- cost of care (by type of cost; claims forms are divided into approximately 20 departmental categories ranging from pharmaceutical to medical supply to ICUs)

### *Compare the Provider to a Norm*

Practice profiles are of no use unless the results are compared to some type of standard. There are certain problems inherent with comparisons in provider profiling. All these problems are resolvable, but medical managers need to be aware of them before embarking on profiling. Comparison against norms is necessary, but it is fraught with potential difficulties, chief of which is defining the norm. There are, broadly speaking, two types of norms: internal (that is, one's own norms if one has enough enrollees or patients) and comparative norms (using external data).

The usual ways of comparing profiling results are to provide data for each individual practice in comparison to one or more of the following internal norms discussed earlier:

- **Total MCO average results.** This standard is simply the average for the entire MCO and is the crudest method of comparison.
- **IPA, POP, or IDS.** A variation of MCO average, this compares the practice only to other practices within a set of providers smaller than the entire network. This approach may be combined with multiple other approaches when an MCO contracts through organized provider systems. Another variation on this is geography, even in the absence of organized provider groups.
- **Specialty specific or peer group.** This compares each practice only to its own specialty (for example, internists are only compared to other internists).
- **Peer group, adjusted for age, sex, and case-mix/severity of illness.** This is the most complicated approach, as noted earlier, but provides the most meaningful comparative data.
- **Budget.** This compares the profile to budgeted utilization and cost, a necessary activity when providers are accepting full or substantial risk for medical expenses.
- **Advanced and statistically based comparisons.** This is coupled with confidence intervals so that a provider will know whether the difference versus the peer group is statistically significant.

Examples of comparative norms include hospital charges or costs; mortality; group practice charges; certain outcomes, such as hospital admission rates; and parameters of greatest interest to MCOs, such as utilization rates (for example, referral rates, prescribing behavior, and so forth), immunization, mammography, or other HEDIS rates. Some of these norms, such as hospital charges and mortality, may be augmented through public use state data tapes. Occasionally, state data tapes (such as in Florida, California, Pennsylvania, and Texas) are adjusted using a reputable severity adjustment tool. More often than not, the state data tape is either not available or, if it is, no risk adjustment is performed. Normative data sets may be internally generated if the MCO is large or part of an alliance that pools similar data. Data sets tailored to the needs of a specific organization are also available for purchase from reputable commercial organizations.

### **Cost the Minimum Amount To Produce**

The specifics of provider profiling costs will not be quantified for the purpose of this chapter. That is, costs are often confidential and are always changing. The concept here is an emphasis on cost minimization, as certain features of profiling are nearing commodity status. The chief financial officer (CFO) cannot be guaranteed a precise return on investment for the costs incurred and must accept them as a necessary, additional cost of doing business better. "Better" means the value added through data-driven prioritization of medical management and other management initiatives, summarized above as the purposes and benefits of profiling.

### **THE NEED TO ADJUST FOR SEVERITY OF ILLNESS**

Case mix and severity are always issues of contention when profiling providers. Providers with costly profiles will always complain that they have the sickest patients. Even if the medical director feels that this really represents whining, when performing profiling the issue of severity *must* be addressed.

At this point, a caution to the reader is required: **Do not** develop your own severity of illness adjustment. Researchers have spent years developing the ones that are summarized below. The cost for licensing the software is substantially less than the cost it would take to develop a home-grown and possibly inadequate system, which would then have to undergo years of independent testing for external validation, prior to achieving the common language status enjoyed by the incumbents.

Practices have differences in the age and sex make-up of their patient panel, which must be considered. These two sets of variables have been the traditional methods that served as a proxy for severity and case mix adjustments. Age and sex are intuitively useful, and capitation payments are routinely modified based on these two parameters. The basic and valid argument is that utilization is predictable based on age and sex, using actuarial tables. While this is true for any large population of individuals (such as what a large insurance company would use to set rates), it provides little real value to any individual physician's expected utilization profile, since, when the numbers are small, chance has more of an influence than do population-based statistics.\*

Geographic differences may also account for some differences in utilization. This certainly occurs when comparing community to community (as discussed and illustrated in Chapter 11). It is likewise common to see differences between rural and urban levels of utilization. As noted above, these trends, whether or not they make empirical sense, are useful when observing population-based numbers, but they retain little relevance when looking at small numbers of events (for example, covered lives, surgical procedures, and so forth). Unlike age and sex, it is legitimate to decide whether or not to include an adjustment for geographic location when crafting profiles. It is more likely to be useful

when looking at large numbers of providers or patients that share the same geographic location; it is less likely to be useful if applied to individual providers based on ZIP code on a one-by-one basis. Noting that one of the purposes of severity adjustment is to better explain differences in utilization, other potential contributors to variation in resource consumption not explored in this chapter are level of education, level of financial income, ethnicity, marital status, and social isolation.

When confronted with the need to examine quality of care and utilization of services, most physicians immediately register the "my-patients-are-sicker" complaint. If possible, *severity* is even more misunderstood than the term *quality improvement*. The following is a summary of the terms that are often thrown about as different parties try to communicate with each other and make decisions on the my-patients-are-sicker issue.

- **Severity of illness** refers to the relative levels of loss of function. At a minimum, this function can be measured in physiologic terms and the ability to perform activities of daily living.
- **Treatment difficulty** refers to the patient management problems that a particular illness presents to the health care provider.
- **Resource intensity** or **severity of service** refers to the relative volume and types of diagnostic, therapeutic, and bed services used in the management of a particular illness.

In the final analysis, however, one must take the approach that case mix adjustments for purposes of quality improvement or utilization management represents the first step and the first step only in the quality improvement process. Provider profiles adjusted for case mix taken at one pinpoint in time should never be used to make final decisions regarding a physician's medical practice. A second step involves the choice of one of several technologies, either claims based or nonclaims based, for case mix adjustment. While current case mix adjustment technologies have significant limitations, they are far superior to that which existed

\*This is sometimes referred to as the "Rule of Small Numbers"—that is, when there are few events to measure, then chance is more influential than are predictions on large numbers of events.



even five years ago, and they continue to evolve. Examination and verification includes posing the types of questions to both the purchaser and software developer that are summarized in Exhibit 18-8.

Severity of illness can be addressed only if one asks, "What is the focus of the analysis?" That is, does the profiling analyze:

- ambulatory visits?
- inpatient episodes excluding the intensive care unit?
- episodes of illness across ambulatory and inpatient episodes?
- nursing homes, rehabilitation facilities, and home care?
- intensive care units?

#### Exhibit 18-8 Questions To Consider When Choosing an Ambulatory Case Mix System

##### Clinical

- Are the base units expressed in clinical terms easily understood and supported by health care professionals?
- Are the base units driven by *International Classification of Diseases*, Ninth Edition, Clinical Modification (ICD-9-CM) or *Current Procedural Terminology*, Fourth Edition (CPT-4), or both?
- Does a mapper exist to trace codes utilizing the code system currently in use in your system?
- If you are looking at episodes, is the unit of analysis the total episode of care (inpatient and outpatient) or are outpatient services only considered?
- Can case examples of the use of the system be provided?
- Does the episode-of-illness system distinguish complications from comorbidities, and, if so, how does it do this?
- Is the episode-of-illness system best used for primary care physicians or specialists or both?

##### Statistical

- What is the predictive capability of the case mix adjustment?
- How are outliers treated? It should be pointed out that the more outliers are removed, the more the statistics will improve at the expense of explaining the entire ambulatory care contact.
- Is it an ICD-9 code-driven system?
- Is a valid method for assigning an ICD-9 code to encounters with missing and nonspecific ICD-9 codes available?

- Is the unit of analysis the total episode of care (that is, links all ambulatory, outpatient, inpatient, and prescription drugs)?
- Does it have a large number of diagnostic groupings (that is, medical conditions)?
- Does it place all available encounter and claims data for each patient into at least one episode of care?
- Is an episode duration defined by the maximum number of days between contact with a physician (that is, window period)?
- For multiple concurrent episodes, is an encounter placed into only one episode (for example, one lab is placed into one and only one episode)?
- Do episodes have an adjustment for comorbidities, severity of illness, and patient age?
- Is the predictive ability of the episode adjustments very high?
- To reduce fragmentation of episodes, are two years of encounter data required?
- Can pattern-of-treatment results for treating specific medical conditions easily be compared across networks and physicians?
- Are the following uses supported?
  - global patterns-of-treatment profiling
  - prescription drug performance/risk
  - clinical guideline development
  - outcomes research
  - physician compensation
  - high-cost patient risk management
  - medical capitation performance/risk
  - workers' compensation performance/risk
  - chronic disease management
  - Health Plan Employer Data and Information Set reporting

Source: Adapted from Norbert Goldfield, Episodes of Illness: Introduction, in *Physician Profiling and Risk Adjustment*, Second Edition, Norbert Goldfield, ed., p. 481, © 1999, Aspen Publishers, Inc.

### Ambulatory Visits

There are two classification systems developed and used in the profiling of individual ambulatory visits or encounters: ambulatory patient groups (APGs) and ambulatory payment classifications (APCs). APGs were developed as a forerunner and are quite similar to APCs. Both are in the public domain. The APCs are to be implemented by HCFA for outpatient prospective payment in hospital outpatient departments and ambulatory surgery centers for Medicare patients. APGs are al-

ready used by a variety of payers (for example, Medicaid and several Blue Cross Blue Shield plans). A number of companies produce main-frame and desktop versions of software for these classification systems. Figure 18-1 provides an example of significant digestive procedures for version 2.0 of the APGs. From a cost and quality perspective, one could, for example, profile providers or MCOs by:

- frequency of the performance of these procedures

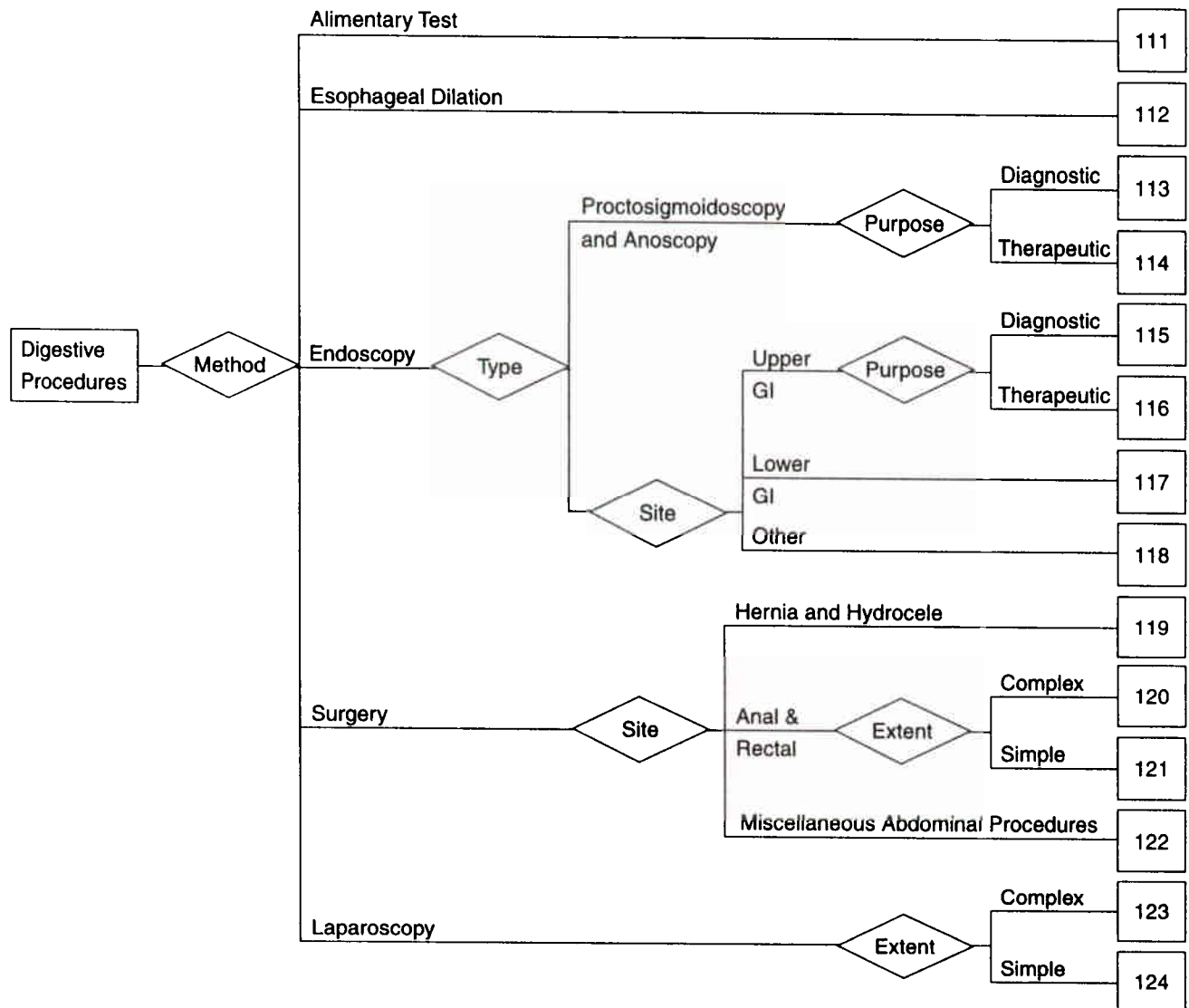


Figure 18-1 Significant Procedure. Source: Data from R.F. Averill et al., *Ambulatory Patient Groups, Definitions Manual, Version 2.0*, Health Care Financing Administration, Office of Research and Demonstrations, and 3M Information Systems.

- performance of minor procedures (such as laboratory tests) for each of these procedures
- satisfaction or other patient derived outcome for any desired APG categories
- profit or loss for specific APGs and APCs

Exhibits 18–9 and 18–10 provide examples of such reports.

### Inpatient Episodes

As of 1999 a number of case mix classification systems were available for provider profiling of inpatient care\*:

- HCFA DRGs are public domain but are *not* severity adjusted. One needs to profile at an institutional level using HCFA DRGs to know the overall financial performance. However, the reasons for that performance cannot be ascertained without using one of the systems described below.
- APR-DRGs (3M/HIS Inc.) are proprietary, use claims data, and are the most widely used severity adjustment in the United States. Two dependent variables are available: severity of illness and intensity of service and mortality.
- Acuity Index Method (Iameter Inc.) is proprietary and uses claims data. Charges are the dependent variables.
- Caduceus (Care Management Sciences Inc., Philadelphia, Pa.) is proprietary and uses claims data. A variety of dependent variables are available.
- Disease Staging is proprietary (Medstat Inc., Ann Arbor, Michigan) and uses claims data. A variety of dependent variables are available.
- Medisgroups is proprietary and uses both claims data and information drawn from the medical record. It is used primarily in Pennsylvania for state reporting purposes.

\*The authors cannot guarantee that these names will remain current; they are provided as a "snapshot" of 1999.

- Michael Pine and Associates have developed customized and proprietary, risk adjustment tools.

A number of intermediary vendors aggregate severity adjusted data from either their own customers or from public use data tapes to produce comparative data. These include not-for-profit alliances and proprietary companies. A practical issue the user needs to decide is whether to hold and manipulate the data in-house and thus have greater flexibility in creating one's own reports or to send the data to a third party and receive reports from that intermediary. Thus, for example, with respect to the APR-DRGs, users can license a work station that provides both standard and ad hoc reports, but they still must load in their data, or they can work with a third-party vendor that processes the data and provides canned or, at a higher price, tailored reports. The choice is made based on economic issues, internal capabilities, and the need to manipulate the data on a frequent basis.

There are several theoretical issues that the medical director of an MCO or large provider system should understand. One of the most contentious is the inclusion of complications versus comorbidities in the logic of the risk adjustment. For example, with specific respect to myocardial infarction, many secondary diagnoses present on admission after an MI likely represent comorbidities or sequelae of the MI. Thus if a patient develops complete AV blockage on the second day of admission, it is likely that this secondary diagnosis represents a comorbidity or sequelae of the MI and not an *avoidable* complication of an MI. One could extend this analysis to a large number of other secondary diagnoses—with specific respect to MI. The state of California has been a leader in providing a middle ground, by collecting data on whether the secondary diagnosis was present on admission.<sup>31</sup> Such knowledge would allow the calculation of separate indices for all codes, rather than only those codes present on admission. This issue extends itself to episodes of illness.

Several articles have appeared recently highlighting the importance of severity adjustment in negotiations between MCOs and hospitals. The



Exhibit 18-9 Expected Profit or Loss Statement: Outpatient Cardiovascular Product Line

<i>APG/APC Category</i>	<i>Description</i>	<i>Type</i>	<i>Count</i>	<i>Paid Amount (\$)</i>	<i>Total Cost (\$)</i>	<i>Profit or Loss</i>	<i>Percent Profit or Loss</i>
71	Exercise tolerance tests	SP	1,056	160	150	10	6.67
72	Echocardiography	SP	969	210	224	-14	-6.25
74	Cardiac electrophysio- logic tests	SP	4	1,250	1,524	-274	-17.98
75	Placement of transvenous catheter	SP	32	780	881	-101	-11.46
76	Diagnostic cardiac catheter	SP	224	1,310	1,940	-630	-32.47
77	Angioplasty and trans- catheter procedure	SP	7	1,250	1,321	-71	-5.27
571	Congestive heart failure and ischemic heart disease	MED	295	180	203	-23	-11.33
572	Hypertension	MED	1,278	67	87	-20	-22.99
573	Chest pain with cardiac enzymes to rule out myocardial infarction	MED	172	390	333	57	17.12
574	Chest pain with cardiac enzymes to rule out myocardial infarction	MED	534	220	197	23	11.68
575	Simple cardiovascular disease except CHF, ischemic heart disease, and hypertension	MED	692	90	114	-24	-21.05
576	Complex cardiovascular disease except CHF, ischemic heart disease, and hypertension	MED	248	160	200	-40	-20.00

Courtesy of 3M Health Information Systems, Wallingford, Connecticut.

Exhibit 18-10 Sample Report: Costs by Provider Service

<i>Surgeon</i>	<i>Number of Cases</i>	<i>Average Procedure (minutes)</i>	<i>Labor</i>	<i>Supplies</i>	<i>Drugs</i>	<i>Equipment</i>	<i>Anesthesia, Drugs, and Supplies</i>	<i>Total</i>
Smith, John	110	75.21	\$608.75	\$208.35	\$60.74	\$195.60	\$182.60	\$1,256.04
Jones, Alice	85	82.09	\$664.47	\$222.49	\$55.43	\$200.58	\$199.43	\$1,342.40
Frank, Bret	60	64.52	\$522.21	\$254.76	\$43.76	\$226.91	\$226.11	\$1,273.75
Kelly, Steve	14	84.80	\$686.37	\$199.76	\$66.72	\$266.40	\$204.62	\$1,423.87
Average		75.50	\$611.09	\$222.72	\$55.59	\$207.84	\$198.77	\$1,296.01

Courtesy of 3M Health Information Systems, Wallingford, Connecticut.

following excerpt describes the importance of risk adjustment both from a financial and clinical care perspective.

An MCO with significant volume approached the hospital requesting a reduction in rates. Specifically, the company had targeted this reduction to an amount that they perceived was the rate being offered by our hospital to other MCOs. Quantification of differences in the relative costliness of a specific hospital's case mix is computed using case mix indices; relative weights had to be calculated. An example for just one condition, congestive heart failure, is provided in Exhibit 18-11. Aggregating these weights across all patients revealed that the managed care plan's weighted average severity index was 1.048, whereas the average for the other plans was .88 (not shown). This difference translated into a 19.1% difference in resource intensity, which was acknowledged by the company as sig-

nificant. Yet, even though negotiations concluded with new rates that reflected the historical case intensity of the plan's patient population, we knew there were significant differences in treatment patterns. Thus, Figure 18-2 reveals that losses for the hospital predominated among severely ill individuals with congestive heart failure, indicating that a high cost case management program might be very efficacious for our institution. In addition, Exhibit 18-12 indicates that there are significant differences in physician practice patterns in the treatment of congestive heart failure with (not shown) similar mortality rates, indicating that implementation of a congestive heart failure guideline might be useful.<sup>32</sup>

### Episodes of Illness

Measuring episodes of illness represents the new frontier of profiling and case mix. It finally will allow researchers and providers alike to examine care provided across a continuum of care. We will not be able to argue anymore, for example, that we cannot measure the risk-adjusted mortality and resource consumption for:

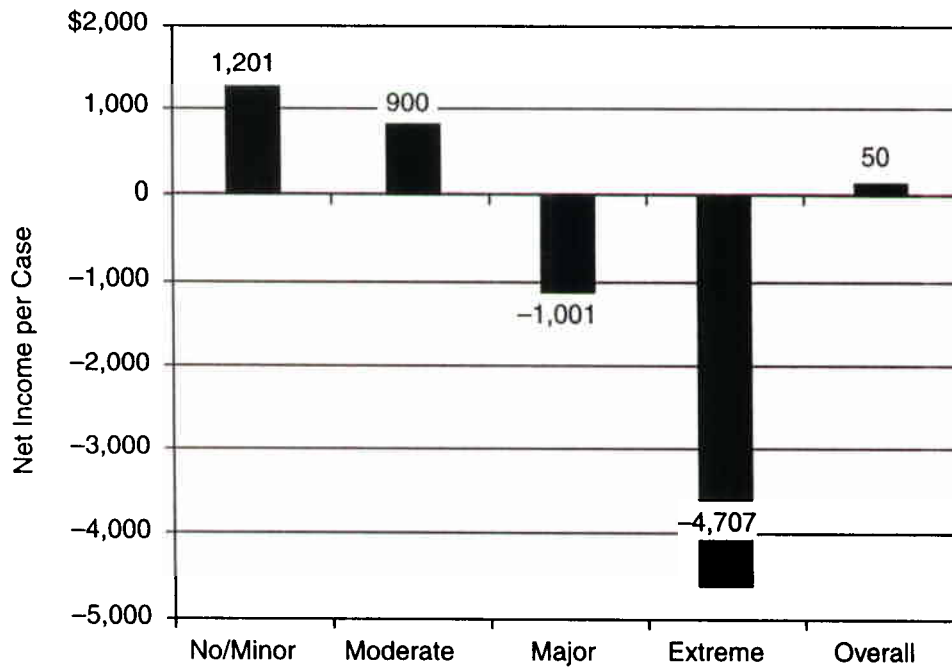
- diabetics for a year's period of time
- patients who have suffered an MI and undergo not only hospitalization but 90 days of posthospitalization treatment
- specific pneumonias, whether the care was provided on an inpatient or outpatient basis

Episodes of care are defined as time-related intervals that have meaning to the behavior you are trying to measure. Episodes may vary considerably both by clinical condition and by the provider type that is being measured. In the case of obstetrics, obvious measures such as Caesarean section rate are important but will not reveal the full picture. Looking at the entire prenatal and postnatal episode may reveal significant differences in the use of ultrasound and other diagnostics, differences in early detection and pre-

**Exhibit 18-11** All Patient Refined DRG Severity Index for Congestive Heart Failure (APR-DRG 127)

	Cases	Percent of Total	Relative Weight
No/minor severity	86	17.6	.6674
Moderate severity	232	47.4	.8562
Major severity	112	22.9	1.2167
Extreme severity	59	12.1	2.0645
Total APR-DRG 127	489	100	1.0514

*Source:* Adapted from P. Jones and G. Strudgeon, Logic and Applications of the All Patient Refined DRGs: The Greater Southeast Community Hospital Experience, in *Physician Profiling and Risk Adjustment*, N. Goldfield, ed., p. 367, © 1999, Aspen Publishers, Inc.



**Figure 18-2** Severity Adjusted Net Income Per Case, Congestive Heart Failure Total New Income \$54,558. Courtesy of 3M Health Information Systems, Wallingford, Connecticut.

vention of complications, or perhaps a great deal of unbundled claims during the prenatal period. In the case of some medical conditions, the episode may extend over the course of years or have no endpoint short of the patient's death (or, in the case of an MCO, disenrollment, at which point data are no longer available).

Furthermore, it is possible for patients with multiple medical conditions to have overlapping episodes of care, making it more difficult to sort out what resources are being used for what episode. Several of the proprietary software programs attempt to deal with this issue by, for example, identifying patients with both congestive heart failure (CHF) and diabetes and separating this group of patients from those who only have CHF.

Related to the issue of episode is the problem noted earlier, of identifying which provider is actually responsible for the patient's care. As an example, an internist or a diabetologist may be responsible for the care of a diabetic but may have little responsibility for managing that patient's broken leg, other than to refer the patient to a good orthopaedist. Identification of the responsible physician is also difficult regarding

hospitalized patients; it is not uncommon for the admitting physician not to be the attending physician, especially when surgery is involved.

The hallmark of episode definition is the ability to link up all the health care resources into a defined event. This may mean diagnostic services (for example, laboratory or imaging), therapeutic services (for example, physical therapy), drugs, consultations, outpatient visits, and inpatient visits. In other words, it must be a patient-based analysis rather than a provider-based one; the analysis of the behavior of providers is a product of examining what happens to their patients. As summarized below, various vendors have constructed proprietary groups for the purpose of simplifying episode development.

There are two purposes for profiling data collected over an episode of illness:

- to prospectively predict costs for the coming year, as this information is useful to adjust capitation rates
- to retrospectively profile for purposes of comparing actual versus expected costs or actual versus expected performance on a variety of quality of care indicators.



**Exhibit 18-12** Select Ancillary Cost Analysis To Support PHO Case Mix and Severity Adjusted 1992 and 1993 Discharges

	<i>Least Efficient</i>		<i>Most Efficient</i>
	<i>Cases</i>	<i>Cost</i>	<i>Cost</i>
APR-DRG 127, CHF			
Severity 1	25	\$7,400	\$5,950
Severity 2	36	8,670	6,770
Severity 3	26	18,390	11,540
Actual	→ 11,120		7,950
Expected Cost	→		
Variance	→ (\$3,240)		

*Note:* 34 and 23 percent of the cases are age > 74 for the most efficient and least efficient practices.  
 Courtesy of 3M Health Information Systems, Wallingford, Connecticut.

Exhibit 18-13 provides a list of currently available episode of illness systems, along with references to informative articles on the systems.

Exhibit 18-14 provides a sample of a data report on diabetes—*severity adjusted*. While the dollars displayed are next year's predicted expenditures, the same type of report can be produced for last year's expenditures (see Exhibit 18-15). One can imagine that such information is useful for disease management programs. Each level of severity can be arrayed against other variables, such as complications or visits to the emergency department.

### Nursing Homes, Rehabilitation Facilities, and Home Care

The numerous proposals and enacted federal legislation to pay for these services on a prospective basis have heightened the importance of case mix measures, all of which are severity adjusted. MCOs will increasingly need to become familiar with these case mix measures as disease management programs begin to more frequently use these types of facilities. Descriptions of the two most commonly used case mix measures follow.

- *Resource utilization groups (RUGs)* have the least severity adjustment built into the system. They are currently used in the prospective payment for nursing homes.<sup>33</sup>

- *Functional independence measure (FIM)* and the *Patient Evaluation and Conference System (PECS)* are used primarily in rehabilitation facilities. Both have excellent severity adjustment measures built into the system. Recently, the Function Resource Groups (FRGs) were developed, using the FIM, for prospective payment.<sup>34</sup> The Outcome and Assessment Information Set (OASIS) has been developed as both a quality of care and payment tool for home care services.

### Intensive Care Units

While typically beyond the purview of the MCO, directors of medical centers will likely want to know the resource consumption and outcomes within the ICU of their, for example, CHF or transplant patients. The most commonly used case mix measures:

- Acute Physiology and Chronic Health Evaluation (APACHE)<sup>35</sup>
- (MPM)<sup>36</sup>
- (SAPS)<sup>37</sup>

A discussion of these systems is beyond the scope of this chapter, as most users are not engaged in this level of detailed analysis. However references are provided for the interested reader.

**Exhibit 18-13 Episode-of-Illness Profiling Systems****Payment Purposes**

- Ambulatory Care Groups (ACGs)<sup>1</sup>
- Diagnostic Cost Groups (DCGs)<sup>2</sup>
- Hierarchical Cost Groups (HCGs)<sup>3</sup>
- Episode Grouper<sup>4</sup>
- The Disability Payment System (DPS)<sup>5</sup>

**Profiling Purposes**

- Episode Treatment Groups (ETGs)
- Episode Grouper
- Diagnosis Episode Clusters (DECs)<sup>6</sup>

<sup>1</sup> J. Wiener, et al., "Ambulatory Care Groups: A Categorization of Diagnoses for Research and Management," *Health Services Research* 26, no. 1 (1991): 53-74.

<sup>2</sup> A. Ash, et al., "Adjusting Medicare Capitation Payments Using Prior Hospitalization Data," *Health Care Financing Review* 10, no. 4 (1989): 17-29.

<sup>3</sup> R.P. Ellis et al., Diagnostic Cost Group (DCG) and Hierarchical Cost Conditions (HCC) Models for Medicare Risk Adjustment. (Prepared for the Health Care Financing Administration, Contract No. 500-92-0020), Washington, DC; April, 1996.

<sup>4</sup> R. Averill, et al., "The Episode Classification System Project," *Journal of Ambulatory Care Management*, forthcoming.

<sup>5</sup> R. Kronick, et al., "Diagnostic Risk Adjustment for Medicaid: The Disability Payment System," *Health Care Financing Review* 17, no. 3 (1996): 7-33.

<sup>6</sup> D. Cave and E. Geehr, "Analyzing Patterns of Treatment Data To Provide Feedback to Physicians," *Medical Interface*, July 1994, 125.

Source: Adapted from Norbert Goldfield, Episodes of Illness: Introduction, in *Physician Profiling and Risk Adjustment, Second Edition*, Norbert Goldfield, ed., p. 480, © 1999, Aspen Publishers, Inc.

**SELECTION OF A PROFILING VENDOR**

Unless an MCO has an extraordinary information system, it will be required to purchase or license services from an outside vendor of profiling systems. In terms of software, there are an increasing number of software products that provide assistance to the health care professional engaged in profiling activities. Broadly speaking, there are three types of products:

- Database or data management tools that allow one to collect information and report

**Exhibit 18-14 Next Year's Expenditures for Diabetics—Severity Adjusted**

Diabetes Level 1	\$3,693
Diabetes Level 2	\$4,514
Diabetes Level 3	\$5,794
Diabetes Level 4	\$7,418

Source: Reprinted from Final Report for CRG Contract for the U.S. Department of Commerce, Washington, D.C.

that information in useful formats. These are sophisticated (from an informatics perspective) empty shells.

- Tools that interface with data management and provide "clinical logic," which points the health professional in particular avenues of investigation of either cost or quality.
- Risk adjustment systems that provide the user with the assurance that apples are being compared with apples. This issue has been discussed above in detail.

There is no need to have all three features in one piece of software. In fact, the key determining factor is whether or not each piece of software is designed in such a way that it can easily interface with other types of software. As illustrated in Exhibit 18-16, there are several distinguishing features that one looks at to aid in the selection of a system.

Exhibit 18-17 provides a more detailed overview of features typically contained in the inventory of the typical service offering of leading vendors who perform physician profiling.

The reader should note that Exhibit 18-17 combines three different elements: the classification systems, information system (IS) platforms, and applications. There will be a somewhat different perspective on each of these three elements depending on the role of the reviewer (for example, the IS director will look at platforms while others may focus on classifications systems or the ease of usability of the application). A brief discussion of some selected points noted in Exhibit 18-17 follows.

**Exhibit 18-15** Diabetes Mellitus: Cost and Quality

CRG DM	Outpatient Laboratory		Mortality APR-DRGs		Complications		Average APR-DRG Charges		Hospitalization	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
Level 1	0.39	0.25	0.12	0.13	4	7				
					3	2				
Level 2	0.47	0.39	0.25	0.19	4	3	\$3,700	\$4,106	1.4	0.5
					2	9				
Level 3	0.40	0.59	4.85	2.26	3	4	4,700	5,757	2.8	1.2
					4	6				
Level 4	0.30	0.75	25.13	17.27	6	12				
					9	6				
					12	11	12,537	9,085	3.1	3.5
					12	18				
					14	9				
					29	17	33,445	21,695	6.8	9.6

Courtesy of 3M Health Systems, Wallingford, Connecticut.



**Exhibit 18–16 Distinguishing Features and Selection Criteria To Use When Evaluating Physician Profiling Vendors**
**Sound Clinical Methodology**

- independently validated in peer reviewed literature with acceptable R2
- applicable to primary and specialty care physicians
- intuitive and easy to explain to practicing providers
- industry standard “universal language” (for example, standard definitions of episodes)
- ability to incorporate inpatient and outpatient care into episodes of care
- sound statistical methodologies

**Reporting Comprehensiveness**

- all data incorporated (ICD-9, CPT, NDC, HCPCS, local codes, NY DRGs)
- all places of services captured
- ability to incorporate user defined fields
- ability to incorporate external benchmarks

**Reporting Flexibility and Presentation**

- ability to report by individual provider, specialty, risk pools, or other user defined group
- analysis variability to include billed, paid, allowed amounts, relative value units, rates per 1,000, per member per month
- ability to complete clinical performance reporting
- ability to vary reporting period and trend data
- ability to drill down to claim level detail
- ability to report by product lines (Medicare, Medicaid, commercial) or aggregate products
- indicates statistical significance for comparisons
- ability to severity adjust at patient level
- ability to integrate with existing legacy systems/ programs for reporting flexibility
- graphic presentation
- actionable reports
- summary level report available with ability to add detail pages

**System Platform/Training and Support**

- platform and Technical Requirement compatibility
- technical and clinical training and support available
- data cleansing process

Courtesy of Ernst & Young LLP, 2000, Washington, DC.

- **Validated methodology.** Methodologies used for severity adjustment and episode construction are more trusted by new users if they have already been evaluated for predictive validity and reliability by the peer reviewed literature and multiple installations.
- **Multiple products for HMO, Point of Service (POS), Medicare, Medicaid.** While profiling in the “lock-in” or 100:0 plan HMO environment is usually straightforward, POS products add new complexity. Whether referred by the PCP with or without the MCO’s approval or if self-referred by the member, resource consumption out of network and in-service area or out-of-service area, strains the information collection completeness and timeliness. Metrics

for Medicare must include influenza vaccination adherence rates, pneumonia and CHF readmissions, and additional items beyond HEDIS requirements. Medicaid populations must build profiles that address maternities with high risk, asthma, HIV-AIDS, care for substance abuse, and care for the elderly, blind, and disabled.

- **Comprehensible by average PC user.** Customers for profiling software and services may settle for shipping a claim tape to the vendor and waiting for a report. However, the recent users are asking for the option to have a terminal on their own bench and training to design ad hoc reports for customized circumstances in real time. They prefer the visual relief provided by a

**Exhibit 18-17 Typical Service Offering of Leading Physician Profiling Vendors**

<b>Tool</b>		
<b>1.0 Inputs:</b>		<b>3.2 Inpatient case mix adjustment method:</b>
<b>1.1 Standard Data Inputs:</b>		3.2a Based on DRGs
1.1a Medical claims		3.2b Based on other methodology
1.1b Encounters		3.2c Based on proprietary methodology (see examples in chapter text)
1.1c Membership (subscriber & dependent level)		3.2d Based on user-defined methodology
1.1d Provider claims with group level and individual physician identifiers along with specialty		<b>3.3 Outpatient case mix adjustment method:</b>
1.1e Pharmacy claims (including formulary and generic indicators)		3.3a Based on APGs, APCs
1.1f Referrals authorizations		3.3b Based on other methodology
1.1h Lab/radiology results		3.3c Based on proprietary methodology (see examples in chapter text)
1.1i Medical records		3.3d Based on user-defined methodology
1.1j Little or no reliance on nonstandard vendor-specific output		3.3e Ability to develop episodes of care and method for linking case events
<b>1.2 User Defined Inputs:</b>		<b>3.4 Exclusion of outliers:</b>
1.2a Credentialing and site visits		3.4a Vendor defined
1.2b Satisfaction survey results		3.4b Different thresholds by specialty or based on other criteria
1.2c Outcomes (that is, health status survey information, preventive screening information)		3.4c User defined
1.2d Site visit and chart audit results (from medical record reviews)		<b>3.5 Comparison Standards/Norms</b>
1.2e Complaint rates		3.5a Vendor methodology to create client-specific practice norms
1.2f Billing practice audit results		3.5b User defined methodology to create client-specific practice norms
<b>2.0 Formatting/Data Mapping:</b>		3.5c Menu/parameter driven ad hoc query tool
2.1 Map data from multiple operational systems (claims UR, administration, pharmacy, enrollment, or membership)		3.5d Programmer level ad hoc query tool
2.2 Map data from multiple external systems (that is, three different claim systems)		3.5e Export spreadsheet/graphics/work processing software
2.3 Integrate external reference files (external benchmarks)		<b>3.6 Statistical capability within the product:</b>
2.4 Standardize formats across multiple sources (internal and external)		3.6a Measures of central tendency (mean, mode, and so on)
2.5 Reference tables to match codes to descriptions (provider name, diagnosis, procedures)		3.6b Significance tests
2.6 Vendor-defined case types (that is, high cost user, chronic condition, and so on)		3.7c Regression
2.7 User defined case types		3.7d Other techniques (specify)
2.8 Medical service unit costs (for capitated services)		<b>4.0 Pre-formatted Reports/Views:</b>
2.9 Relative value units		<b>4.1 Reports by product lines (Medicare, Medicaid, POS, HMO, PPO)</b>
<b>3.0 Adjustment Tools:</b>		<b>4.2 Financial reports:</b>
3.1 Age/gender adjustment		4.2a Medical budgeting (by standard categories—medicine, surgery, OB/GYN, MH/CD)
		4.2b Rating/Underwriting
		<b>4.3 Hospital:</b>
		4.3a Financial
		4.3b Utilization (that is, service use per members)
		4.3c Quality

*continues*

## Exhibit 18–17 continued

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| <p><b>4.4 Physician (Individual with specialty norms):</b></p> <p>4.4a Financial</p> <p>4.4b Utilization</p> <p>4.4c Quality</p> <p>4.4d Clinical practice management</p> <p><b>4.5 Risk group (by practice, IDS, planwide):</b></p> <p>4.5a Financial</p> <p>4.5b Utilization</p> <p>4.5c Quality</p> <p><b>4.6 Across sites/places of care:</b></p> <p>4.6a Utilization</p> <p>4.6b Quality</p> <p>4.6c Referred, self-referral, referred out of network rates</p> <p><b>4.7 Employer Reporting:</b></p> <p>4.7a Vendor defined</p> <p>4.7b HEDIS formats (planwide, by product line, by IDS, by practice)</p> <p>4.7c Quality/outcomes indicators</p> <p><b>4.8 Standard report features including graphic capability:</b></p> <p>4.8a Executive level reports</p> <p>4.8b Management level reports</p> <p>4.8c Transaction level reports</p> <p>4.8d Drill down capability between reports and levels</p> <p>4.8e Vendor defined parameter for exception/outlier reports</p> <p>4.8f User defined parameter for exception/outlier reports</p> <p>4.8g Trend analysis</p> <p>4.8h Actual versus budgeted</p> <p>4.8i Actual versus expected ratio based on statistical norm</p> <p>4.8j Actual versus expected based on clinical norms</p> <p>4.8k User defined changes in the sort order</p> <p>4.8l User defined changes in populations (different providers, diagnoses, and so on)</p> <p>4.8m Routines for ranking variations (providers, employer groups, diagnoses)</p> <p>4.8n Vendor-defined exclusion criteria (other than outliers)</p> <p>4.8o User-defined exclusion criteria (other than outliers)</p> <p><b>4.9 Precalculated descriptive statistics:</b></p> <p>4.9a Utilization rates</p> | <p>4.9b Unit costs for medical services</p> <p>4.9c Per member per month</p> <p>4.9d Expected versus actual</p> <p><b>4.10 Modeling capability:</b></p> <p>4.10a Alternate benefit design</p> <p>4.10b Alternate payment/reimbursement methodology</p> <p>4.10c User customization of standard reports/views</p> <p>4.10d Standard graphs as companion to standard reports</p> <p>4.10e User customization of graphs</p> <p>4.10f Presentation quality output for external distribution</p> <p>4.10g Production report capability</p> <p><b>5.0 System Operational Features</b></p> <p>5.1 System security</p> <p>5.2 Licensing agreement details regarding use by affiliated provider groups</p> <p>5.3 Interface ease (for graphic packages)</p> <p>5.4 Analytic/interpretive support</p> <p>5.5 Technical support</p> <p>5.6 Training/user documentation—retraining for updates and user groups</p> <p>5.7 Data dictionary</p> <p>5.8 Help desk availability and hours or operation</p> <p><b>6.0 Corporation Specifics</b></p> <p>6.1 Years in business</p> <p>6.2 Revenue/earnings growth</p> <p>6.3 Number of employees in company</p> <p>6.4 Employees dedicated to technical support</p> <p>6.5 Current client count</p> <p>6.6 Current installations and average time for installation</p> <p>6.7 Data format</p> <p><b>7.0 Technical Architecture</b></p> <p>7.1 Operating platform</p> <p>7.2 Frequency of updates (include the most recent update dates)</p> <p>7.3 Service bureau capabilities</p> <p>7.4 System hardware needs (specify)</p> <p>7.5 Turnaround time for data processing</p> <p>7.6 On-line capability with remote access connectivity</p> |
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Courtesy of Ernst & Young LLP, 2000, Washington, DC.



graphical user interface and deplore tabular data. They want to be self-managing. There are several work stations that provide this facility to the average PC user.

- **Carve-out accommodated.** As MCOs have separate agreements with subcapitated programs (managed behavioral health, chiropractic, pharmaceuticals, lab, and so on), the better profilers are equilibrating their report packages to ensure apples-to-apples comparisons. Although important throughout this chapter, profiling from within any capitated entity (especially physician group) will not be possible if encounter CPT-4 data are not submitted, such that MCOs have had to develop reward programs for completeness-of-capture for encounter information. In addition, pharmaceutical information should get to the level of drug name, dose, and route of administration.
- **Prioritization of services for focused review.** Briefly mentioned earlier in this chapter, this capability represents an essential management tool for MCO utilization management departments. They do not want to hassle righteous physicians. They want to reduce the overhead attached to operating these oversight activities dedicated to micro-management. They would prefer not having to do old-fashioned “utilization review” at all. The better profilers arm them with information to perform this targeting.
- **HEDIS production and other accreditation requirements.** Profiling vendors vary in their willingness to produce the administrative data portion of HEDIS reports (see Chapters 20 and 26 for HEDIS data requirements). Conservative vendors argue that claim data integrity is unknown, such that the electronic production of such a report is unreliable. Other vendors dedicate energy to claim tape edits and “cleansing” processes, whereby a level of confidence is achieved. The user can learn portions of this track record where a vendor has produced a HEDIS report that was externally audited.

- **Statistical packages.** Simple averages or colorful pie graphs are not adequate today. Tests of statistical power expressing significance using  $p$  values and confidence intervals using standard deviation are essential.
- **Easy-to-use interfaces.** This is critical if a user wants to import data from other sources or to integrate plan data with, for example, software that will help build a clinical guideline.

## THE FUTURE OF DATA USE

The future of data use in medical management and provider profiling can be expected to increase far more rapidly than has occurred to date. With the increasing presence of e-commerce, technology that allows for cheaper and faster storage and processing, and increasing sophistication in applications, there will be uses of data that are either now only just being realized, have not even been conceived of at the time of publication, or have been conceived but are unknown to the authors.

To get a sense of immediate future uses, it is useful to look at some examples of advanced applications of data and information that are being implemented by some organizations at the time of publication, but are not yet widespread. These examples include the following.

- A large MCO is utilizing a clinical data warehouse for studying medical cases. The system stratifies the member population into groups that can benefit from outreach programs and case management, and measures effectiveness and outcomes of quality improvement programs.
- A large MCO partnered with a vendor to develop a data warehouse housing both operational and medical information. They plan to use the data warehouse to identify profitability of business, operational improvement opportunities, and improve quality of care.
- A major vendor is using a centralized data repository that integrates financial and pa-

tient encounter data into a single location. This solution also includes an electronic medical record that supports inpatient and outpatient care delivery and drives financial and administrative systems.

- A large MCO has developed a long-range plan to link its disease management database with clinical records to track medical outcomes.
- A large MCO provides computerized patient profiles, with red-print flagging tests or procedures that are due according to treatment guidelines to assist physicians in treating patients with coronary artery disease.
- A large MCO is implementing a national clinical information system bringing clinical knowledge to individual physicians at the most important moment when encountering a patient and in a manner that supports the best clinical decisions.
- A large MCO has developed a disease management program that is entirely supported by an on-line library of clinical guidelines and other forms of decision support powered by the organization's clinical intranet.

The future of provider profiling can be analyzed from two perspectives: the push for external release and the integration of disparate types of information leading to a significant reduction in costs and simultaneous increase in validity for increasingly sophisticated physician profiles. With respect to the latter, it is clear that increasingly sophisticated, yet inexpensive provider profiles will be available. We are on the threshold of a revolution in lifting the electronic and organizational barriers to inexpensively linking salient elements for physician profiling. With respect to hospital-based care, many hospital-based systems will be able to link clinical and administrative data in the near future, significantly increasing the power of the profiles for hospital-based services. Health care organizations are expending significant resources in an effort to link hospital and ambulatory care data. In the short (or already existing) term, advances in this area will result in:

- A link between specific pharmaceutical and severity adjusted claims data. This will increase the clinical validity of, for example, examining outcomes of care for diabetics. These databases are available now.
- A link with outpatient laboratory values. For example, this will provide further clinical validity for the analysis of outcomes for diabetics. The value of a hemoglobin A1C is an example of an excellent outcome-dependent variable in the follow-up of diabetics.
- A link between patient health status and claims-based, laboratory, and pharmaceutical information.

The challenge will be implementation, which is still difficult. Policy makers will need to pay attention to the following types of issues:

- Acceptance by individual physicians and other consumers of the report card. Acceptance includes not only participation in the development of the profile but also an in-built quality improvement process to use the profiles effectively. This applies to all consumers of the profile, not just physicians. Though profiles and information are now being made available to consumers, we still understand very little about how consumers can best use these profiles.<sup>38</sup>
- Protection of patient confidentiality through existing and future regulation, without eliminating the ability of medical management to improve quality and manage cost appropriately.
- The development and implementation of new statistical and profiling techniques to enhance the validity of the physician profiles.<sup>39</sup>

In the meantime, however, we need to have strategies in place for current efforts to promote valid and reliable provider profiling. Such strategies on provider profiling need to address the need to constructively deal with issues of patient confidentiality, a research agenda on provider profiling, and internal and external release of information.

## CONCLUSION

Profiling has become a necessary tool for any medical manager or provider in order to compare performance and results against both peers and expected results. While this is often seen as threatening (and has sometimes been used that way), it can also provide useful data to allow a physician (or other provider) to improve performance. Profiling is far more complex than simply taking snapshots of individual activities of a

provider, and, in fact, that type of profiling is of little value. Profiling must be performed from the perspective of what happens to the patient, it must incorporate adjustments for severity and case mix (as well as age and sex), and it must be meaningful and useful to the medical managers and the providers themselves. Ultimately, profiling must also be meaningful and useful to consumers as well. Profiling is a continually evolving tool that will become ever more effective.

### *Study Questions*

1. Discuss the principles of using data to manage health care delivery systems.
2. List the most important utilization and cost reports a medical director would need by model type, and describe the key elements in those reports.
3. List the most important quality reports a medical director would need by model type, and describe the key elements in those reports.
4. Describe the most common technical, clinical, and organizational problems medical directors face in using data to manage utilization, and what steps might be taken to deal with those problems.
5. What are the most important principles in provider profiling? What are the most common problems with profiling and how might a plan address those problems?
6. What common sources of data are accessed in producing data for medical management? How can problems with each of these data sources cause problems with the others?
7. What are the types of case mix measures available for each type of health care encounter?
8. Discuss HIPAA requirements regarding privacy and protected health information.
9. What are the challenges of public vs. confidential disclosure of provider information?
10. What are some of the questions to consider when considering a case mix/risk adjustment system and/or profiling vendor?

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