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DataWatch

How Will Outcomes Management Work?
by Donald M. Steinwachs, Albert W. Wu, and Elizabeth A. Skinner

Abstract: A consortium of employers and managed health care organizations has come together to test the feasibility and usefulness of an outcomes management system, a new strategy for providing information on what types of medical care are effective, for whom, and under what circumstances. Systematic measurement of health outcomes can provide the information that patients, providers, and insurers/employers need to make informed choices among alternative treatments and services. A pilot project in thirteen sites found that outcomes management is feasible for evaluating ongoing care for chronic conditions but is difficult to apply for short-term diagnostic or treatment episodes. Further, successful implementation requires a commitment of substantial organizational resources.

Managed care figures prominently in current proposals for health care reform. An important element in some proposals is the health plan “report card.” This would provide consumers and purchasers with information on the quality of the performance of health plans, including outcomes of care and patient satisfaction. Such reports do not now exist, but they might look like a Consumer Reports table to aid persons in making choices among health plans. The technology for producing such report cards is beginning to be tested. This DataWatch discusses the results of a feasibility test of the capacity of thirteen managed care organizations to capture outcomes information for two health conditions.

The patient outcomes assessment methodology builds in part on the proposal made by Paul Ellwood in his 1988 Shattuck Lecture. He challenged physicians, health care executives, and payers to implement outcomes management, a systematic approach to collecting information on the impact of medical care on patients’ health outcomes:

Outcomes management consists of a common patient-understood language of health outcomes: a national data base containing information and analysis on clinical, financial, and health outcomes that estimates as best we can the relation between medical interventions and health outcomes, as well as the relation between health outcomes and money, and an opportunity for each decision-maker to have access to the analyses that are relevant to the choices they must make.¹

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Medical care is now largely directed at the diagnosis and treatment of symptoms and problems. Establishing an outcomes management system represents a significant change from usual practice. The feasibility of accomplishing this goal is largely untested.

**Consortium of employers and insurers.** Eleven members of the Managed Health Care Association (MHCA) took seriously the challenge of understanding outcomes. As major employers who pay for the medical care of employees and dependents, they recognized the promise of managed care as a solution to many health system problems. The key to managed care is timely and reliable information that can guide informed decision making. In 1990 these MHCA members joined to test the feasibility and usefulness of outcomes management in meeting their and their employees’ needs for better information. They included their managed care organizations as partners in the effort to develop and apply patient outcomes information. They enlisted the assistance of the Health Outcomes Institute (formerly InterStudy) to coordinate the effort and the Johns Hopkins Health Services Research and Development Center to provide technical assistance in design, analysis, and interpretation of patient outcomes studies.

Over the past two years the group has established a collaborative effort in which all parties have agreed to use standardized data collection methods, pool the collected data, and jointly analyze the feasibility and usefulness of outcomes management systems. Here we describe the results of the feasibility testing of outcomes management systems in thirteen managed care organizations using two conditions, cardiac angiography and asthma.

### Feasibility Testing Of Outcomes Management

**Purpose.** The assessment of feasibility involved obtaining the answers to three questions: (1) Can different types of managed care organizations successfully collect outcomes data on enrolled populations who are being treated for specific conditions? (2) Will the information collected be sufficiently reliable and valid to describe patient outcomes and to identify factors related to variations in outcomes? (3) Will the information collected provide useful predictors of outcome that can be used by employers, managed care organizations, providers, and patients to improve the overall quality of care? Positive answers to the first two questions were considered critical for the group to be able to proceed beyond the feasibility phase. The answer to the third question was expected to represent a longer-term effort, beginning with the feasibility study and proceeding into larger-scale data collection, analysis, and application efforts.

The MHCA chose to examine two patient populations: those with asthma and those undergoing coronary angiography. Both conditions are
very common, accounting for substantial morbidity for the public and a large proportion of total health expenditures for major companies. Asthma affects a younger population and is managed largely on an outpatient basis but may require hospital care if it is severe or poorly controlled. Diagnosis of actual or suspected coronary artery disease requires coronary angiography—a costly, discretionary, and invasive procedure.

**Study design.** Each managed care organization attempted to obtain a sample of at least forty patients who were scheduled for coronary angiography and a sample of at least eighty adult patients who were under care for asthma. Asthma patients were to be sampled from three strata: hospitalized for asthma in the past year, not hospitalized but seen in an emergency room for asthma in the past year, and receiving only routine ambulatory care for asthma in the past year.

Each patient was asked to complete a questionnaire to provide information on current health status, past health events, use of services, and satisfaction with care. The treating physician also was asked to complete a questionnaire regarding the patient’s condition and current treatment. A report on the results of the angiography was also to be obtained. Three months after the initial questionnaire, the patient was again asked to complete a questionnaire on changes in health status, use of services since the baseline questionnaire, and satisfaction with care. Together these questionnaires constituted the outcomes management systems data set.

**Study Results**

Overall, using filed claims, most managed care organizations were successful in sampling asthma cases but experienced substantial problems in sampling coronary angiography cases.

**Coronary angiography sampling.** Most managed care organizations had expected to use their precertification systems, which approve payment for all but emergency procedures, to select patients scheduled for coronary angiography. To do this would require precertification at least forty-eight hours prior to the procedure. The lead time was necessary to deliver the questionnaire for the patient to complete before the procedure was performed. Alternatively, the managed care organizations could obtain information from the patient over the telephone, but this also required adequate lead time to schedule and complete. Most coronary angiographies were precertified and scheduled less than forty-eight hours before the procedure was performed. Thus, relying on precertification did not provide a representative group of patients with which to assess outcomes.

Successful sites changed their sampling method to recruit patients into the study directly from the cardiologist’s office or in the angiography labo-
ratory. This strategy worked best for group practice organizations and those with enrollees concentrated in a specific geographic area using a few hospitals for coronary angiography. The average numbers of cases identified were related to sampling strategy, as was successfully obtaining responses to the initial questionnaire (Exhibit 1). Managed care organizations that placed outcomes management systems staff in cardiologists’ offices or in angiography laboratories were more likely to come close to the target sample size.

**Asthma sampling.** Claims-based sampling of asthma cases worked reasonably well. For plans with claims processing systems, some programming was required to sort cases by diagnosis and site of care. For plans without such systems, alternative approaches were applied. At one site, for example, an automated medical record provided the sampling frame. Among the cases sampled by diagnostic code, 7 percent subsequently were found not to have asthma based on the report of either the patient or the physician. Many of these patients had been seen in an emergency room with asthma as the preliminary diagnosis. As a result of this finding, a recommendation was made to require at least two occurrences of the diagnosis in the claims records before a case would be sampled. This has been found to be a reasonable method for reducing the number of sampling errors.²

**Response rates.** The response rates from baseline and follow-up patient questionnaires and from physician questionnaires were highly variable and raised serious questions about the study’s feasibility. As each source of variation was identified, it became clearer that higher and more consistent response rates could be obtained if the problems associated with each of these sources were successfully resolved.

Exhibit 2 shows the response rates for baseline and follow-up patient questionnaires, along with physician response rates. Overall, the average patient questionnaire response rates vary from low to unacceptable. Within

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**Exhibit 1**

<table>
<thead>
<tr>
<th>Outcomes Management Study Of Coronary Angiography: Eligible Cases And Completion Rates, By Study Method Used</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of sites</strong></td>
</tr>
<tr>
<td>All sites</td>
</tr>
<tr>
<td>Precertification</td>
</tr>
<tr>
<td>Site notification</td>
</tr>
<tr>
<td>Outcomes management study staff on site</td>
</tr>
</tbody>
</table>

Source: Authors’ survey data.

² Reliance on cardiologists’ offices to notify (usually by telephone) the managed care organization when a patient was scheduled for angiography.

³ Outcomes management project staff assigned to cardiologists’ offices or angiography lab to identify and recruit patients.
### Exhibit 2
Average Completion Rates For Baseline And Follow-Up Patient Questionnaires And For Provider Questionnaires, Outcomes Management Study

<table>
<thead>
<tr>
<th></th>
<th>Coronary angiography</th>
<th>Asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbers of cases sampled</td>
<td>254&lt;sup&gt;a&lt;/sup&gt;</td>
<td>962</td>
</tr>
<tr>
<td>Patient questionnaires</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent completing baseline questionnaire</td>
<td>70.5%</td>
<td>55.7%</td>
</tr>
<tr>
<td>Percent with baseline completing three-month follow-up questionnaire</td>
<td>67.0</td>
<td>65.1</td>
</tr>
<tr>
<td>Physician questionnaires</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent with baseline having a completed physician questionnaire</td>
<td>93.4</td>
<td>79.0</td>
</tr>
<tr>
<td>Percent with baseline having a completed angiography results form</td>
<td>82.0</td>
<td>_b</td>
</tr>
<tr>
<td>Percent of cases with baseline questionnaire that have all data complete</td>
<td>52.1</td>
<td>55.6</td>
</tr>
</tbody>
</table>

Source: Authors’ survey data.
<sup>a</sup> Excludes one managed care organization that did not provide sampling information.
<sup>b</sup> Not applicable.

Each average, some sites obtained response rates above 80 percent and some below 30 percent. Unexpectedly, the response rates for physicians tended to be higher than for patients. In two sites this was achieved by using chart abstractors to complete forms.

There were no consistent differences found between organizational types of managed care plans (group-model health maintenance organizations [HMOs], individual practice association [IPA] HMOs, and mixed types). Contrary to expectations, group practice plans on average did not achieve consistently higher response rates than did plans that rely on a national network of providers. This finding suggests that the feasibility of outcomes management may not be as dependent on a plan’s organizational arrangements as initially anticipated.

The study found a positive relationship between staffing levels for data collection and response rates (Exhibit 3). Response rates increased between the moderate- and high-effort groups in the coronary angiography study, and between the low- and moderate-effort groups in the asthma study. In both studies those plans that committed limited staff time to the collection of data and the follow-up of nonrespondents had the worst results. This raises concerns about how affordable outcomes management may be as a routine data collection and analysis activity for managed care organizations.

All sites were provided with a protocol to follow whenever a patient failed to respond to a questionnaire. This protocol included a postcard reminder after two weeks, followed by another questionnaire after another two weeks, and followed in another two weeks by a telephone call and the...
Exhibit 3
Completion Rates Of Outcomes Management Study, By Level Of Effort On The Part Of Managed Care Organization

<table>
<thead>
<tr>
<th></th>
<th>Full-time-equivalent staff involved</th>
<th>Baseline completion rate</th>
<th>Follow-up completion rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cardiac</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High effort</td>
<td>1.36</td>
<td>75.8%</td>
<td>70.8%</td>
</tr>
<tr>
<td>Moderate effort</td>
<td>0.50</td>
<td>57.8</td>
<td>68.6</td>
</tr>
<tr>
<td>Low effort</td>
<td>0.17</td>
<td>55.7</td>
<td>13.3</td>
</tr>
<tr>
<td><strong>Asthma</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High effort</td>
<td>1.36</td>
<td>57.1</td>
<td>77.1</td>
</tr>
<tr>
<td>Moderate effort</td>
<td>0.50</td>
<td>69.1</td>
<td>67.3</td>
</tr>
<tr>
<td>Low effort</td>
<td>0.17</td>
<td>38.6</td>
<td>40.9</td>
</tr>
</tbody>
</table>

Source: Authors’ survey data.

offer to complete the interview by telephone. Sites with limited staffing generally failed to comply fully with the follow-up protocol. Possibly the most difficult part of the protocol was contacting patients by telephone. Since many patients work during the day, successful telephone follow-up required data collection staff to work nights and weekends. This was a new experience for managed care organizations that never had carried out enrollee surveys that required high response rates.

The experience convinced many managed care organizations that they were not staffed adequately to undertake outcomes management. Either they would need to develop dedicated and trained staff to manage the activities, or they would need to contract with an experienced health survey firm to conduct major components of the data collection activity. In the long run, though, if outcomes management becomes a routine aspect of a managed care organization’s operations, response rates are likely to be higher without the level of effort and expense now needed.

**Reliability and validity.** The analyses of health status measures and treatment measures, and the validation of patient-reported health status against clinical status indicators, showed high levels of reliability and validity. This was as expected for the thirty-six-question health status measure (the SF-36) used in the baseline and follow-up questionnaires.

The validity of patient-reported health status as a measure of disease status is a more complex question. To begin to explore this, we examined the relationship of selected disease-specific measures to eight dimensions of self-reported health: general health, physical health, mental health, social interaction, pain, energy, physical role functioning, and emotional role functioning. Patients who reported a higher frequency of chest pain and taking medications for angina also reported significantly poorer general health and physical role functioning, greater pain, and less energy.
In contrast, the results of the coronary angiography procedure were not found to be significantly related to self-reported health status just prior to the exam. The number of diseased vessels, percent occlusion of the left main artery, and percent occlusion of the left anterior descending artery did not achieve statistical significance. Although the sample size was relatively small, the absence of a significant relationship between disease status and self-reported health status raises interesting questions.

For asthma, there are no comparable definitive diagnostic tests available to make similar comparisons. Using patient and physician reports of clinical indicators, patients hospitalized more frequently, treated as inpatients, and taking steroids reported significantly lower health status. These mixed findings point to the need for better information on the relationship of disease severity and general health status as one means to clarify the potential impact of successful treatment on patients’ health outcomes.

**Predictors of patient outcomes.** The feasibility study provided an opportunity to determine whether the measures obtained as potential predictors of change in health status were indeed correlated. Among patients undergoing coronary angiography, anatomic disease severity (number of diseased vessels, and percent occlusion of major vessels) was not significantly related to patients’ health status scores. While average health status improved, extent of coronary occlusion was not a good predictor of subsequent improvement. Among asthma patients, we learned that average health status did not change. However, persons who reported “knowing what they needed to know to manage their condition” and who reported in the baseline questionnaire receiving better-quality care experienced significantly more positive changes in health status, controlling for baseline health status and severity-of-disease indicators.

Employers and managed care plans discussed the potential usefulness of these findings. The consensus was that the preliminary information on predictors of outcomes was interesting, but the current outcomes management design had failed to provide information on what specific aspects of the care process could be modified to improve outcomes. The employers and their managed care organizations also agreed that a major value of the collaborative effort would be the opportunity to compare their own managed care plan’s performance against the average of the entire group, adjusted for differences in case-mix and severity of cases.

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**Recommendations For The Next Phase**

The feasibility study gave participants a new appreciation for the cost and complexity of outcomes management. It also pointed to the need to modify the outcomes management strategy as the group moves to the next
phase: a test of the usefulness of outcomes management information for quality improvement. Four valuable lessons were learned as a result of the feasibility study: First, outcomes management data collection requires the commitment of significant staff resources and the application of rigorous survey research methods if it is to be successful. If a managed care organization does not want to make the commitment internally, an alternative is to contract with an experienced survey research firm for the data collection phase. Second, collection of outcomes data from a representative group of patients at the time of an elective procedure may not be feasible for all or most managed care organizations, unless the patient questionnaire becomes a routine component of quality monitoring. This finding led to the decision to focus on chronic disease management, not on elective procedures, in the next phase of the project. Third, the time interval between baseline and follow-up patient interviews should be longer than the three months used in the feasibility study—possibly six months to one year. This will allow more time for changes in treatment and in health status to occur for more patients. Fourth, patient and physician questionnaires should be modified to include questions that can link specific elements in the care process to positive and negative changes in health status, as well as to patient satisfaction. One method for doing so would be to incorporate treatment information and measure adherence to accepted treatment guidelines.

The consortium is moving ahead to implement the next phase of data collection, that is, testing the usefulness of the outcomes management information. In this next phase each managed care organization will be expected to sample 600 patients with each condition, some of whom may be ineligible because of disenrollment between sampling and the time of the survey. Target completion rates are 80 percent for patient baseline and two annual follow-up questionnaires. This should result in complete baseline and follow-up data for at least 200 patients with each condition in each organization. With sixteen managed care organizations participating, the expected numbers of cases should exceed 3,200 patients per condition.

The question of usefulness to be tested in the next phase requires an answer to the question of “useful for what?” The consortium has worked to refine a set of questions to guide the assessment: (1) How does control of access to services affect patient outcomes and patient satisfaction, including availability of twenty-four-hour access to providers by telephone, easy access to appointments, and access to specialty care? (2) How do deviations from accepted treatment recommendations relate to patient outcomes and changes in outcomes over time? (3) How do variations in practice style, follow-up visit intervals, use of monitoring tests and procedures, and discussion of treatment options affect patient outcomes and satisfaction? (4) How does patients’ confidence in their ability to manage their chronic disease,
The potential role of outcomes management in health care reform can be envisioned at several levels: purchaser (employer or health alliance), accountable health plan (for example, managed care organization), patient/consumer, and regulator. As outcomes management provides information on which treatments work, for whom, and under what circumstances, it will provide critical insights into where quality improvement interventions should be initiated. This is illustrated in the asthma feasibility study, in which we found that adults who reported adequate self-management knowledge had positive changes in health status outcomes. This suggests that educational interventions may be useful; in the next phase we hope to learn more about what the deficits in knowledge are and how they relate to the care received. Also, we found a relationship between patients’ perception of receiving high-quality care and having a positive change in health status. With more detailed information on differences in care received between those who reported better and worse quality of care, it should be possible to assess the potential for quality improvement. Clearly, the value of outcomes management systems to providers and managed care organizations should be in how to improve quality.

Access to outcomes management information could help purchasers and consumers make informed choices among alternative health plans. Outcomes management provides a standard method for measuring severity-adjusted outcomes of care for common conditions. As such, this could be the key to successful implementation of a system of report cards. The findings presented would support the feasibility of assessing outcomes of care for chronic conditions. For acute and life-threatening conditions, severity-adjusted mortality may remain the preferred outcome measure.

State and federal regulators will need information on quality of care to license and accredit facilities and providers, as well as to assure policy makers and the American public that health care reform has not compromised quality. Outcomes management could fill an important role in providing information on the quality of care and whether it exceeds the minimum standard. The methodology could be integrated into national data collection efforts through follow-up surveys of patients who have been seen in the offices of physicians sampled in the National Ambulatory Medical Care Survey or who have been discharged from hospitals sampled in the National Hospital Discharge Survey. The National Center for Health Statistics is exploring the feasibility of patient follow-up surveys as one means to improve health information.
As outcomes management moves from concept to application, there will be much to learn regarding its potential usefulness to providers, managed care plans, patients, and regulators. In the context of managed care, it can be seen as a building block for a new generation of patient care information systems that truly provide the information needed to manage the care of patients in a manner that assures the best health outcomes possible.

This project was supported by the Consortium for Outcomes Management Systems of the Managed Health Care Association and coordinated by the Health Outcomes Institute (formerly InterStudy). Employer members of the consortium are AT&T; Ameritech; Becton, Dickinson and Company; Commonwealth of Virginia; Digital Equipment Corporation; General Electric Aerospace/Martin Marietta; General Motors Corporation; GTE Laboratories; HealthTrust; Hercules; Honeywell-DASD; James River Corporation; Marriott Corporation; Procter and Gamble Company; Promus; and Xerox Corporation. Managed care organizations participating in the consortium as partners of the above employers include Aetna Life and Casualty; Blue Cross and Blue Shield of Illinois, Massachusetts, Missouri, Rochester, and Virginia; CIGNA; Community Mutual Blue Cross and Blue Shield; Fallon Community Health Plan; Harvard Community Health Plan; intermountain Health Care; Kaiser Permanente/Cleveland Region; Matthew Thornton Health Plan; Metropolitan Life Insurance Company; The Prudential; The Travelers; and U.S. HealthCare. The design of the project was the collaborative effort of the Evaluation Subcommittee of the Managed Health Care Association. The subcommittee members during this phase of the project included James D. Bell (Procter and Gamble), Pat Zerger (U.S.Q.A.), James Couch (The Travelers), Laura Crow (Honeywell), Susan Garrison (Kaiser Permanente/Cleveland Region), Joseph M. Healy Jr. (Harvard Community Health Plan), Ronald Parson (Aetna Life and Casualty), Alan Peres, subcommittee chairman (Ameritech), Charlene Roshkopf (Marriott Corporation), and Ann Saladino (Blue Cross and Blue Shield Of Missouri). Other contributors to the project were Michael Huber and John Doyle (Health Outcomes Institute); Robert A. Bethel (National Jewish Center for Immunology and Respiratory Medicine); David B. Pryor (Duke University Medical Center); and, from the Johns Hopkins University School of Hygiene and Public Health, Haya R. Rubin, Sam Shapiro, Jonathan Weiner, and the late Marilyn Bergner.

NOTES

3. The reliability coefficients (Cronbach’s Alpha) ranged from .80 to .92 for eight scales of the health status questionnaire. The coefficients are similar to those found in J.E. Ware and C.D. Sherbourne, “The MOS 36-Item Short Form Health Survey (SF-36): I. Conceptual Framework and Item Selection,” Medical Care 30 (1992): 473-483; and C.A. McHomey, J.E. Ware, and A.E. Raczek, “The MOS 36-Item Short Form Health Survey (SF-36): II. Psychometric and Clinical Tests of Validity in Measuring Physical and Mental Health Constructs,” Medical Care 31 (1993): 247-263.