A Method for Assessing the Outcome of Acute Primary Care

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This article describes a method of looking at the outcomes of one aspect of primary care. A prospective study was implemented to obtain data on approximately 1,700 patients who sought treatment for acute illnesses at two model clinics run by the Family Practice Residency Training Project at the University of Utah Medical Center. The article presents a model for how similar studies might be made in a family practice setting. It illustrates what types of information might be obtainable that would prove useful to a family practitioner as he seeks to improve the quality of his care.

Some 1,700 acute care episodes were studied to assess the outcomes in terms of the extent to which patients regained their usual functional status. Involving active follow-up of each patient, the study serves as a prototype for measuring several components of quality of care including actual outcomes, patient expectation of outcome, physician expectation of outcome, and patient satisfaction with outcome and care. Because this study was conducted in a family practice residency training setting, we hope that it will serve as a model of how such information may be used to increase residents' sensitivity to the course of illness commonly seen in primary care, and to encourage the residents to set expectations for the care they give.

It can safely be said that medicine has entered the Age of Accountability. Concern about the quality of care – what it is and how to measure it – is very evident in the professional literature and in federal regulations. Although many have tried to resist this pressure as an infringement on professional sovereignty, this movement should provide great opportunity for family practice.

As Lewis noted, evaluation of quality of care has come full circle – from the most basic outcome measurements, such as mortality, through an emphasis on structure and process review, and back to outcomes again, now with a more sophisticated point of view.[1] This evolution has been associated with a shift in emphasis from hospital care for the acutely ill to the more diffuse management problems of ambulatory care. Although hospitals were the natural targets for the first efforts to obtain data on patients with similar, definable problems, relatively complete documentation, and substantial per unit costs, there is increasing recognition of an equal or even greater need to understand the factors that affect quality in the broader area of primary care.

The efforts made to correlate the outcomes of care with certain professional standards for what ought to be done in a given instance have been frustrating.[2] In the ambulatory setting, where patient record keeping may be less complete, the emphasis on outcome rather than process is particularly appropriate. The development of quality-of-care studies in the primary care setting offers an opportunity to understand more about this type of care – how it works and what makes a difference; these goals reflect the desire of some family practitioners to become more actively involved in applied research.

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Methods

One clinic was housed in the University Hospital and the other in an affiliated, community hospital. The physician staff consisted of first, second, and third-year family practice residents, attending physicians on the family practice faculty, and physician assistants.

In order to focus on the episodes of care that would offer some possibility of producing a functional change as a result of the physician's intervention, all patients who presented with an acute complaint during the nine-month period of the study were asked by interviewers we had trained, to participate as they entered the clinic for their appointments. (In the case of children, the parent was interviewed.) Patients who were seen for treatment of chronic problems without exacerbation, for general health maintenance such as pre-natal care, and patients who required hospitalization in the course of treatment were excluded. The study was explained to patients in terms of the doctors' desires to obtain better follow-up information about their patients; a bilingual, written statement was given to each participant stating that the interviewer would call before coming to his home for additional information.

There were very few refusals to participate. Approximately eight percent of the patients could not be reached for follow-up, and another six percent experienced a second, separate episode of illness before follow-up. These were omitted from the final analysis. Repeated clinic visits for the same problem were included in the

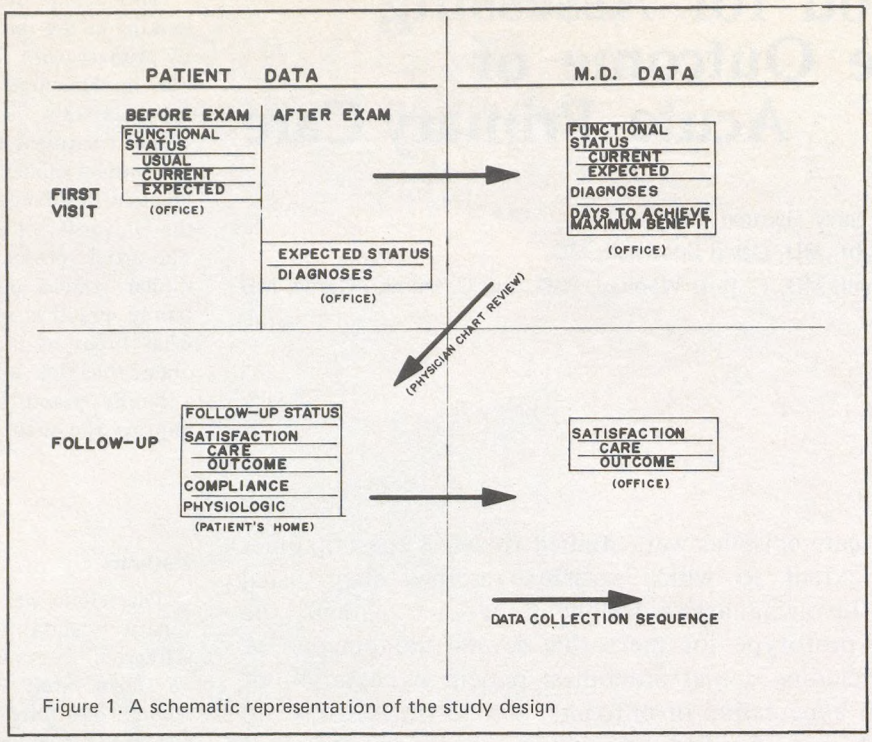

Figure 1. A schematic representation of the study design

same episode. Occasionally a patient returned after follow-up with a new illness and was enrolled for a second episode. The overall study design is diagrammed in Figure 1.

Clinic Visit

Each patient was interviewed before he was seen by a physician; his age, sex, usual functional status (defined as that approximately six months prior to the clinic visit), his presenting functional status (as reflected by the degree of impairment imposed by the current illness), and the status the patient hoped to achieve or return to after treatment were recorded. The interviewer determined from the patient's responses to questions about his usual and recent activities what the functional status was; the interviewer used a previously tested six-level index that was adapted from Williamson.[3] The levels chosen were (1) full activity without symptoms, (2) full activity but with presence of an underlying physical or laboratory abnormality without symptoms, (3) symptomatic but with full activity, (4) symptomatic with restricted activity, (5) limitation of mobility, and (6) confinement to bed. Approximately seven percent of the patients were unable or unwilling to estimate their follow-up status. This group was handled as a separate category in the analysis when necessary.

After the patient had been seen by a physician, he was again asked by the interviewer to describe briefly his impression of the nature of his illness according to the information conveyed to him by the physician and to note any change in the follow-up status expected for him. Only four percent of the patients were still unable to estimate their follow-up status at this time. As many as three diagnoses were recorded per patient, using the H-ICDA code; thus, either symptoms or specific diagnoses – whichever accurately represented the level of resolution of the diagnostic process – could be specified.

Sometime on the same day, each physician was asked to give his estimation of the patient's current functional status, the diagnoses, the length of time necessary for the patient to receive the maximum benefit from treatment, and when and what level of function the patient should achieve. If treatment for several problems was involved, the time estimate was made for the major acute diagnosis; the maximum time allowed for treatment to achieve results before a follow-up visit was set at six months. The physician could delay making his estimate of expected status until laboratory data were returned if he desired.

Independent Case Review

In the interim before follow-up, an independent physician reviewed the chart of each patient to determine what data were needed at the follow-up visit. A minimum data base for each study patient, consisting of weight, hematocrit, blood pressure, and urinalysis, had been established. These data were gathered at the time of follow-up if they had not been recorded in the chart or if they had

been abnormal and no subsequent normal values were recorded. Similarly, laboratory tests ordered for the specific problem were repeated for the same reasons. The reviewing physician had also noted for the interviewer any specific instructions regarding medication, diet, activity, etc, that the physician had given the patient. At this time the reviewing physician also compared the care provider's estimation of presenting functional status to the interviewer's determination so that gross discrepancies might be detected or to account for the existence of an underlying disease which would place the patient in functional-status classification 2. In general, unless there was contravening evidence in the chart, when discrepancies in reported symptoms were discovered, the interviewer's impression was used because it fit the criteria established.

Follow-up Visit

At the time specified by the physician, an interviewer saw each patient in his home to determine his follow-up functional status. The interviewer also performed any of the tests needed to complete the minimum data base or to evaluate the effectiveness of treatment, such as blood pressure checks, throat cultures, urine cultures, and so on. Some test was required for approximately ten percent of the patients. If unexpected abnormalities were found, the interviewer immediately called the clinic to obtain instructions or to make an appointment for the patient to see his own physician for further follow-up.

A compliance score, derived from the average of reported behavior in any of four possible areas (medication, diet, activity, and other), was computed for each patient and then dichotomized. Finally, the interviewer questioned the patient about his satisfaction with the care he had received and his satisfaction with the outcome he had achieved. A single specific question was asked about whether or not the patient was satisfied with his care and a second separate question focused on his satisfaction with the outcome.

The interviewer later conveyed the information on follow-up status and patient satisfaction, along with any other comments the patient made about the episode, to his physician and asked that the physician state his satisfaction with the care and the outcome also. This, unfortunately, allowed the physician to be influenced by the patient's opinions, but it was necessary so that the physician could know the actual outcome.

For the purpose of this analysis, a good functional or physiological outcome was defined as one in which the patient's follow-up status was equal to or better than his usual status prior to illness. The patient's expected status was also compared to the follow-up status to assess whether the expectation was met. The two measures of satisfaction represented a third type of outcome score.

The physicians were expected to treat their patients in the usual manner during the study; no attempt was made by the investigators to influence their behavior. The possibility that some physicians might change their practice behavior during the study because of information gained from the follow-up interviews was considered, however. The physicians were informed about the study in advance, and a vigorous attempt was made to encourage their cooperation and to minimize the time and paperwork required of them, particularly so that follow-up visits would not be delayed by a backlog.

Cost Factors

The costs for each episode of care were recorded by specific components (physician, laboratory and x-ray, medication, and other) and totaled. Data on physician office-visit costs, laboratory and x-ray expenses, and other fees were obtained from the clinic and hospital billing records. All billings charged between the clinic visit and the estimated time of maximum benefit were included. Fees discounted for employees or welfare patients were recorded at the full usual charge. The physician fee schedule used was competitive with local private providers, although the clinics were partially supported by federal grant funds and the residents were paid by salary. Medication costs were determined from the price charged in the hospital pharmacy for all medications prescribed by the physician, whether or not the prescriptions were filled. "Other" costs were minimal and were not analyzed separately. Cost subcategories were analyzed in terms of both relative (percent of total) costs and actual dollars.

Process Evaluation

In addition, two process measures of quality of care were employed. First, after all data had been collected, we performed process review on the charts of all patients with diagnoses for which explicit criteria for ambulatory care had been developed by the local Professional Standards Review Organization. The criteria for this review varied in length from 5 to 37 items and were designed to be a standard for minimum acceptable performance. Because this provided no absolute standard for relative levels of good or poor care, the normative standard of care against which each case was compared was the average number of items missed for each diagnosis by this population of physicians. Diagnoses for which there were very few cases were not included in the process review.

Second, as part of the teaching program, a sample of each resident's charts were reviewed periodically by other residents and the faculty, according to standards based on the correct use of the problem-oriented record.[4] For this study, the individual items on which the resident was reviewed were abstracted into five general categories and an overall summary statement regarding quality of care. The questions were as follows:

1. Was the problem list properly prepared?
2. Was the problem list used?
3. Was the data base complete?
4. Was treatment appropriate for the problems listed?
5. Was follow-up adequate?
6. General rating of care.

Results

With so many individual pieces of information available, the spectrum of possible analyses is quite broad. First, the relationship between the chosen outcome measure and a variety of patient, provider, and disease characteristics can be learned. Second, functional outcome can be compared to other outcome and process measures to evaluate their relative strengths and usefulness as approaches to assessing quality in ambulatory care. Both types of analyses can assist the private physician in determining how his own patient population may be unique, and what aspects of his professional behavior are especially strong or merit extra attention.

Among the total 1,761 patients who made up the final sample of this study, 76.5 percent experienced good outcomes; but 23.5 percent of these patients with supposedly acute complaints had not returned to their usual status by the time of follow-up. There were a small number, less than three percent of the total sample, who had been thought to be entirely normal prior to their acute illness, but, through either the discovery of underlying chronic disease or the failure of treatment, they had a persistent laboratory abnormality on follow-up which left them with a bad outcome despite resolution of the acute symptoms. However, for the other 21 percent, the poor outcome represented a major decrease in daily functional activity.

It is important to keep in mind that the illnesses chosen for assessment consisted in large measure of presumably self-limited conditions. Several explanations of the failure of this group of patients to regain their usual status can be entertained: they may have developed new problems, although those with clearly identifiable new episodes of illness were eliminated. More likely, the original problem may have been misdiagnosed. A more serious complaint may have been mistaken for a self-limited condition. In addition, some of the poor outcomes may be the result of complications of treatment, a particular concern in otherwise self-limited conditions.

Patient factors that could be related to outcome include age, sex, compliance, and patient understanding of the illness. Although the proportion of older patients in this population was small (six percent were over the age of 50), the percentage of bad outcomes did not increase substantially with age (Table 1), indicating that this factor alone did not greatly influence the overall results. Sixty percent of the patients were female, but the difference between males and females in outcome was slight (78 percent vs 75 percent good outcomes). A total of 1,518, or 86 percent of all patients, were requested to comply with one or more instructions; 1,328, or 87 percent, did comply. Compliers had 78 percent good outcomes, while noncompliers had 70 percent good outcomes, not a great difference; 75 percent of the patients without instructions achieved good outcomes.

To determine if outcome could be related to the degree to which patients understood the nature of their illness as communicated to them by their physician, we matched the diagnoses reported by each patient against those reported by the physician. As shown in Table 2, patients with poor knowledge scores (or, alternatively, instances of poor physician communication) had at least as high a percentage of good outcomes as did those who knew exactly what was wrong with them.

Another possibility that might have affected the outcomes was that the physicians might have underestimated the length of time necessary for patients to achieve benefit from treatment. (It has already been pointed out that if they overestimated to the extent that the patient contracted a separate illness before follow-up, the case was removed from the study.) However, as seen in Table 3, there was only a slight decrease in the percentage

Table 1. Outcomes by Age of Patients

Age	% with Good Outcome	N
< 1	73	91
1-5	78	255
6-15	78	339
16-30	80	662
31-50	69	313
51+	62	101

Table 2. Relationship between Patient's Knowledge of Diagnosis and Outcome

Knowledge/Communication*	% with Good Outcome	N
Perfect (4-digit match)	77	1475
Correct disease type (3-digit match)	73	138
Correct organ system (2-digit match)	79	132
None (no match)	81	16

*Because the 4-digit positions of the H-ICDA code categorize diagnoses by organ system and type of disease, a 4-digit match between two diagnoses was considered perfect agreement, a 3-digit match represented patient knowledge of correct type of disease, and 2-digit matches were matched by hand by an independent physician to make sure that signs or symptoms appropriate to a specific etiologic diagnosis were not missed.

Table 3
Relationship between Length of Time until Follow-up Visit and Outcome

Days to Achieve Maximum Benefit	% with Good Outcome	N
< 1 week	80	566
1-2 weeks	79	769
3-4 weeks	72	158
> 4 weeks	66	268

Table 4. Outcome by Presenting Functional Status

Presenting Functional Status (severity)		% with Good Outcome	N
2	(Asymptomatic with lab abnormality)	76	45
3	(Symptomatic)	75	997
4	(Restricted activity)	79	646
5 and 6	(Limited mobility)	74	73

of good outcomes as the length of time until follow-up increased; this tends to refute the likelihood that this was an important contributing factor.

Because some patients are more severely affected by illness than others and because some types of disease have inherently different recovery rates, the relative percentage of good outcomes was compared according to the different levels of presenting functional status and for each of the diagnoses with more than 50 cases. There were nine such diagnoses and 988 patients in this category; other problems were very widely distributed, with the largest categories being forms of respiratory disease (mentioned 581 times), and injuries (187 times); 650 complaints were non-specific signs or symptoms. The percentage of good outcomes did not vary with the different levels of impairment at the time of the first visit for that episode (Table 4), but among the common diagnoses examined individually, abdominal pain and headache stand out with remarkably poor outcomes (Table 5).

Looking at other outcome measures, 95 percent of all patients achieved the follow-up status that they anticipated after being seen by the physician. Approximately four percent of the patients changed their estimation after having been seen by the physician; three fourths of those who changed their estimate actually were less accurate. Six percent of patients were initially unable to estimate their follow-up status but made an accurate estimate after their visit.

Satisfaction

Ninety-six percent of the patients were satisfied with the care they received, and 90 percent were satisfied with their outcomes. As might have been expected from the structure of the study, the figures for physician satisfaction were virtually identical. However, in those instances where patients were not satisfied with their care, 71 percent of physicians were satisfied with the care; and where patients were not satisfied with the outcome, only 44 percent of the physicians were satisfied with the outcome. Among the patients who actually experienced bad outcomes, 92 percent were still satisfied with the care they received, and 65 percent were satisfied with the outcome itself. Among the patients who failed to achieve their expected outcome, more (97 percent) were actually satisfied with their outcomes than among patients who did achieve their expectations (89 percent).

Satisfaction with care and outcome were not found to be related to cost. It is thus difficult to postulate a rational basis for patient satisfaction or to argue for it as a useful, overall outcome measure.

The cost data were valuable in showing how funds were allocated to different medical services and how outcome was related to cost. The average total cost per episode was $20.71. Physician and office fees were $12.75 (71 percent); laboratory and x-ray fees, $4.35 (nine percent); and medication, $3.22 (18 percent); other costs made up less than two percent of the total. For patients with good outcomes, the average total cost was less than for patients with bad outcomes ($20.04 vs $22.89).

Better process scores were also found to be related to good outcomes, but the implications to be drawn from process data must be limited by the small number of cases on a small spectrum of mainly infectious diseases rather than the broader range of ambulatory care problems.

Table 5. Outcomes for Selected Diagnoses

Frequent Diagnoses	% with Good Outcome	N
Otitis	80	134
Pharyngitis	83	192
URI	81	261
Flu	80	49
Abdominal pain	64	88
Rash and dermatitis	73	52
Back and neck pain	70	53
Cough and bronchitis	71	96
Headache	63	52

Discussion

Additional relevant data that could be gathered in a similar primary care setting would include whether the physician had previously seen the patient or if the visit was an initial encounter; the number of appointments scheduled and kept; and the patient's impression of the nature of his illness before he saw the physician. These data could be used to test the rationale for continuity of care – that a knowledge of a patient's usual state of health and previous response to treatment regimens would enable the physician to achieve a good outcome with fewer intermediate steps. This would permit the physician to omit safely steps in the care process that might lower their performance scores when compared with process criteria but, if it were safe and effective, the proportion of good outcomes should remain high.

Also, because incidental office charges could distort the amount of the physician fee when used as an indicator of physician time, it would be helpful to know what actual utilization of other resources was associated with each unit of treatment, follow-up, or complication. Finally, because a substantial portion of the patients either changed their expectation or developed a new one after talking with the physician, it would be interesting to see how this related to the type of disease and various other communication factors.

A study like the one described can be particularly useful as a part of an educational program; a central argument for all forms of evaluation has been the educational benefit to be derived. The private practitioner, accustomed to treating the individual patient, may lack a sufficiently critical perspective of his overall performance or his performance relative to his peers. The experience of examining outcomes offers an opportunity that other techniques do not – it establishes an internal system of quality assessment in which the ultimate validator is *whether or not the patient achieved the results that the physician intended.*

As this study suggests, neither the patient nor his physician at the present time has a clear concept of what should be expected of their interaction in the health-care delivery system. Many experts have recommended that the patient be taught what to expect, and many practicing physicians would concur that more realistic goals would benefit many patients. We have not yet reached the stage where each physician sets the individual patient's goals and communicates these in turn to the patient. Each physician is the product of training, which has traditionally insisted upon the possibility of maximum improvement for each patient, if only all our knowledge and skills are properly applied. Recent data have, however, shown that this is not always the case. The physician is, therefore, called upon to see for himself what will make a difference in his own practice; and the emphasis on outcomes offers him a way to do this.

One important goal for this type of outcome assessment might reasonably be that the family practice resident would change both his attitudes and his behavior to reflect his concern for outcomes and his recognition of the need to think prognostically. This might take a tangible form through a modification of the way in which he keeps his records. We would hope to see the now familiar SOAP-format of the problem-oriented record expanded to include two new concepts: prognostication and concern for patient outcome.

The assessment of a patient should include not only the highest level of diagnoses justified by the data but also a prognostic statement indicating the degree of improvement (or deterioration) expected and the anticipated time course. Similarly, the plan would include a specific method for follow-up, so that the actual outcome could be ascertained. While this might necessitate a return visit, other means to assure contact should also be considered lest we continue to misinterpret no news as always meaning good news.

This would require a mechanism for obtaining direct feedback on the patient's ability to function after treatment and the degree to which he cooperated with instructions so that treatment corrections could be undertaken at appropriate times. This system of follow-up need not, however, be dependent on a physician's time, since it has already been shown that a clerk with some initiative can gather much useful data by telephone.[5] In fact, most patients recognize and appreciate this effort to improve their care and report greater satisfaction with their care when they know that the physician is interested in what happened to them after seeing them.

Documentation of prognosis and outcome measures in the records of family practitioners would mark a major step forward for the specialty. The regular amassing of such data could provide a rich resource for useful research. The continuous process of prognosis-with-feedback would also sharpen the skills of the practitioners and perhaps alert them to important additional factors to consider when dealing with primary care problems.

Family practice is a discipline in transition. We have been shown the need for new ways of thinking in regard to the way problems are presented[6] and the diagnostic taxonomies most appropriate.[7] It is now time to reinforce this need for increased attention to prognosis and evaluation. This type of progress provides the kind of information from which new knowledge derives. It is the kind of research appropriate to family practice.

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