

Continuity of Care in Family Practice

Part 3: Measurement and Evaluation of Continuity of Care

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Continuity of care is basic to the value system of family practice. Yet it is not often treated as a measurable quality, and the role of "continuity" in improving the "outcome" of health care is infrequently evaluated. "Continuity" can be understood in terms of its elements: continuity of a professional relationship, continuity of information, and the actual delivery of service or care. These elements in turn can be related to outcome by means of a series of assertions or hypotheses which together constitute a "theory" of continuity of care. This paper develops these ideas and reviews existing research which has examined continuity of care.

Continuity of care is perhaps the most frequently cited essential of sound family practice. Yet "continuity" remains incompletely defined and rarely quantitated.

In 1967 White stated, "There is virtually no evidence that continuity of care makes a difference. We have been through the literature in detail and can find no evidence that continuity of the doctor-patient relationship for patients in the general population makes any difference in measurable outcomes."¹ In 1975, the situation with regard to demonstrating the importance of continuity of care has not changed appreciably. Practitioners of family medicine must choose either to accept continuity of care as an article of faith, or to develop systematic methods to test and document its importance.

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The purposes of this paper are to identify several distinct elements of continuity, and to suggest a systematic approach to measuring these elements and to evaluating their relationship to significant aspects of "outcome."

To accomplish evaluation, one must achieve the following:

1. There must be a concept or theory to describe the issue of interest. Such a theory should relate some attribute (in this case "continuity of care") to some consequence or outcome. If there are important intervening issues or processes, they should be identified.
2. There must be means to objectively identify and quantitate (even by so crude a measure as "present" or "absent") both the attribute (continuity) and the outcome or outcomes.
3. There must be some means to separate the effects on outcome of the attribute being evaluated from those of other factors. It is nearly impossible to isolate the effects of "continuity" from effects of "comprehensiveness" or "teamwork." The methods of analysis must be capable of identifying and separating the effects of several variables.
4. Finally there must be a working

entity, a practice, actually attempting to apply the concept in the delivery of care. Such a practice must be willing to be studied and evaluated. Just as important as finding appropriate practices for such study, is limiting the difficulties that the evaluation process imposes on a service delivery unit. The study itself may have effects on process and outcome.

What is Continuity of Care?

The term continuity of care contains several distinct elements. Most often we intend "continuity" to mean a continuing relationship between a physician or health professional and a patient. A second kind of "continuity," which is independent of specific health professionals, can exist if there is continuity of data or information. Thirdly, there is a sense of "continuity" which calls attention to the actual accomplishment of care itself. In carrying out a treatment or health maintenance plan, the patient herself (or members of her family) is of great importance. It is possible to imagine care being received independently of any continuing effort except that of the patient.

Before discussing the issues of measurement and evaluation that seem pertinent to each of these rather different ideas, it seems worthwhile to place them together in a "theory." The central hypotheses of this "theory" are diagrammed in Figure 1. They include the following:

I. Favorable health outcome is dependent upon receiving specific efficacious services. If a course of such services is completed, we can speak of continuity of *care*, and greater "continuity" in this sense improves outcome.

II. Accuracy in the match of services to problems is dependent on availability of clinical data, including information which describes the patient's past health care and illness experience. This second hypothesis within the "theory" postulates that continuity of necessary data (information) facilitates and strengthens the delivery of needed service (continuity of *care*).

III. The third hypothesis holds that the availability of information (and understanding of the patient's needs) is increased by greater continuity of the patient-professional relationship.

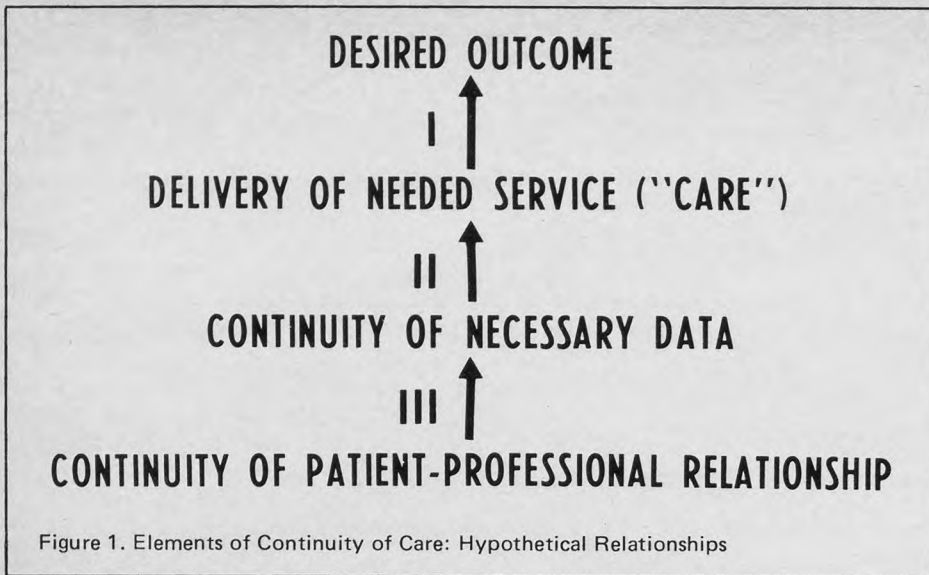


Figure 1. Elements of Continuity of Care: Hypothetical Relationships

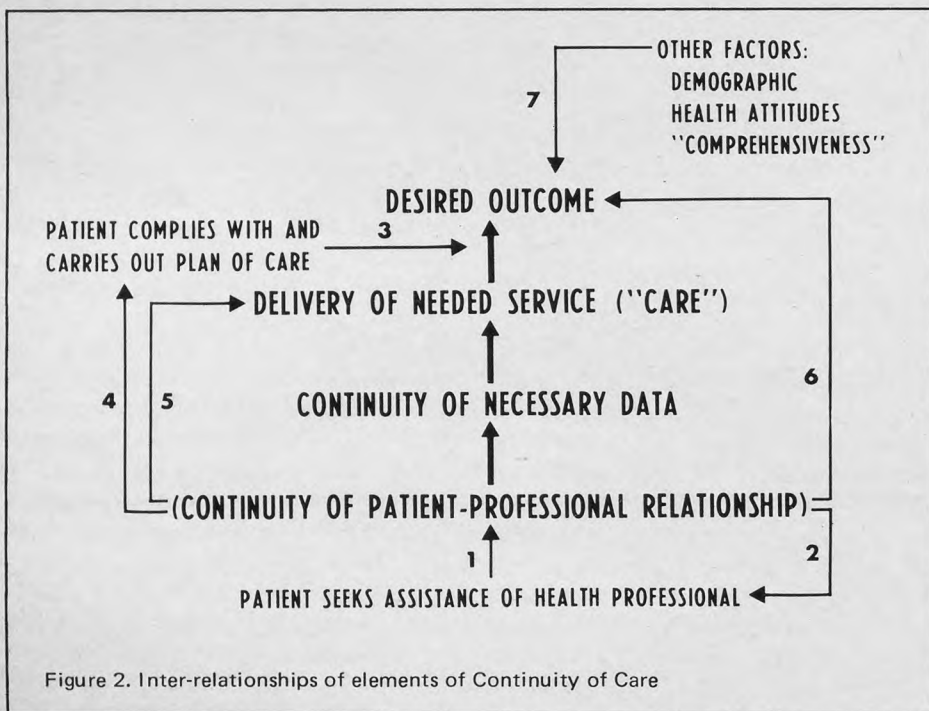


Figure 2. Inter-relationships of elements of Continuity of Care

Continuity of relationship facilitates continuity of information and understanding, which in turn promotes delivery of accurate and effective care. To test the theory, one must identify means of quantitating the several forms of "continuity" and "outcome."

In this basic form, the "theory" is clearly too simple to be helpful in accounting for complex issues involved. In particular, the role of the patient is not made clear and must be further specified. Other major factors which affect outcome must be recognized. The expanded "theory" is outlined in Figure 2.

Examination of the relationships presented in Figure 2 permits identification of additional hypotheses. Several involve actions of the patient: (Numbers correspond to Figure 2.)

1. The patient initiates the patient-professional relationship. Accordingly, attitudes and behaviors of the patient are predominant in maintaining (and explaining) continuity of the relationship.

2. The greater the degree of continuity of relationship, the easier it will be for the patient to initiate further contacts leading to continuing care. In other words, access to the health professional is facilitated.

3. Continuity of care depends on compliance of the patient with a treatment or health maintenance plan. Characteristics of the patient will thus be of great importance in predicting compliance.

4. A greater degree of continuity of relationship will be associated with a higher degree of compliance.

Additional hypotheses depend less directly on actions initiated by the patient.

5. Continuity of the patient-professional relationship directly facilitates the delivery of needed service. This effect is independent of the continuity of data. For example, this hypothesis stated in a positive form predicts that a patient is more likely to accept a diagnostic or therapeutic suggestion (and undergo the corresponding procedure) if there is an established patient-professional relationship, and that the effect is greater with increasing measure of continuity.

6. There is a direct positive effect of continuity of patient-professional relationship on outcome. This involves the physician (or the relationship) acting as a therapeutic agent.

In addition, a satisfactory "theory" must identify the role of factors other than "continuity" which affect outcome. Figure 2 identifies a number of such factors which most would agree are of substantial importance (and which may have either positive or negative effects on outcome). The final hypothesis (7) states: Outcome of care is strongly influenced by characteristics of the patient and her environment, attitudes of the patient and practitioners, "comprehensiveness" of care, and other factors. If continuity of care is to be isolated from such factors and studied in a systematic way, methods must insure that patients well matched for other characteristics are randomly assigned to groups differing in degree of continuity.

Outcome

Evaluation is dependent upon measurement of defined outcome. Three distinct elements of outcome which will be relevant to the evaluation of continuity are listed in Table 1.

The outcomes of greatest interest are those associated with the health status of the patient. To measure such outcomes we commonly think in terms of death, disease (or illness),

disability, discomfort, and dissatisfaction.² Starfield has suggested an alternative system based on assessing each person in terms of a system of descriptors of the individual. Changes in the descriptor (such as in the continuum from "fully functional" to "incapacitated") can be utilized as measures of outcome in relation to independent variables of interest including degrees of "continuity."³ Such measures can also be used to characterize the status of a group of patients if calculated as averages or rates.

There are also measurable qualities which can be associated with the process of care. These may bear significant relation to continuity, and may properly be considered as a kind of "outcome." It might be asserted that, for example, a greater degree of continuity would be associated with a higher (or lower) cost of care over time. There is a commonly held view that greater continuity is associated with fewer (or more appropriate) referrals, with decreased hospitalization rate and so forth. Few studies document these important assertions and much work remains to be done.

Finally, there is a set of qualities or characteristics which describes outcomes for the provider. These relate particularly to the work habits, attitudes, and expectations of the professional within the patient-professional relationship. Continuity may be associated with greater (or less) job satisfaction, confidence, comfort in decision-making, or productivity. There has been surprisingly little attention paid to this aspect of outcome of continuity of the patient-professional relationship, in spite of the clear contractual nature of the relationship with important expectations held by both parties.

Empirical Studies Evaluating Continuity of Care

Having developed a "theory" which summarizes the relationships which exist between the several elements of continuity of care and between "continuity" and outcome, it is worthwhile to survey briefly the type of work which has been done to test some of these relationships. Perhaps even more important, one can begin to identify the kinds of evaluation which must be done within a practice or training program to assess the elements of continuity in ongoing practical work.

Table 1. Outcomes of Care

Outcomes related to <i>health status</i> of patients:
—application of health status measures to individuals
—rates for indicators applied to a population
Outcomes related to <i>process</i> of care (examples):
—cost associated with care
—use of procedures, consultations, diagnostic tests
—hospitalization
Outcomes related to status of <i>provider</i> :
—satisfaction, confidence, sense of accomplishment
—measures of practice success, income, collection rate

Compliance Studies and Continuity of Care

Most studies of compliance have dealt, appropriately, with conditions in which the diagnosis and therapeutic steps are clear-cut and an important outcome can be confidently related to the treatment. Examples include antibiotic therapy for streptococcal pharyngitis or otitis media, or adherence to immunization schedules or to planned therapy for tuberculosis. To measure continuity in this sense, one must make an accounting of planned and needed services actually received. For efficacious therapies, continuity of care is important until the episode requiring care is over. The unit of focus is the episode. For chronic illness or health maintenance, such continuity of care must be thought of as ongoing but can be defined over specified periods of time.

Table 2 presents some examples of types of measurements and studies that evaluate continuity of care.

As one reviews the literature of such studies, the results are depressing if one has hoped that all of one's

patients obediently comply with care, let alone "participate" in managing their health. An excellent review of this subject is included in a paper by Gordis et al describing their studies of compliance with penicillin prophylaxis for rheumatic fever.⁴ In the Gordis study, 36 percent of patients were "non-compliers," defined as having measurable penicillin levels in urine specimens less than 25 percent of the time. Only 36 percent were taking penicillin more than 75 percent of the time.

This is by no means an exceptional result. Various studies indicate that 30 to 50 percent of patients fail to comply with recommended therapy for a variety of chronic illness regimens. Ireland reported in 1960 that 30 to 65 percent of patients treated for tuberculosis were non-compliant with chemotherapy and 26 percent were lost to follow-up after one year.⁵

Bergman reported (1963) that 56 percent of a studied group receiving penicillin orally for streptococcal pharyngitis had stopped therapy by day three, 71 percent had stopped by day six, and 82 percent had stopped by day nine.⁶ Lest this all be charged to studying "disadvantaged" patients, Hardy reported in 1956 that 40 percent of patients from a high socioeconomic group failed to follow through on planned consultation for hearing and vision defects found in children through routine health supervision.⁷

Clearly, there are major problems of "continuity" at the "action" end of the health care process. It should be obvious that we can make no assumption regarding compliance in our practices and teaching programs. There is need for ongoing evaluation, even of the aspects of care we take for granted.

There are several studies that have begun to identify elements that support improved compliance. The studies of penicillin compliance of Charney and co-workers are one example. The "theory" suggests that continuity of relationship could be one factor. He found that compliance was better when the patient's "regular" doctor prescribed the treatment.⁸

Other interesting clues have been identified by Gordis. For rheumatic fever prophylaxis, compliance in peni-

Table 2. Measurable Indicators of Continuity of Care

Examples:

Immunization status

—by patient (complete, partial, incomplete)

—by disease, for population as rates

Prenatal visits kept

Preventive survey compliance

Completion rate of course of therapy

Compliance with chronic therapy

Table 3. Measurable Indicators of Continuity of Information

Is information which will be needed in the future available?

Examples:

—immunization status

—past and current medication

—allergies

—weights and heights

Does information lead to action?

Examples:

—response to abnormal finding or lab study

—response to identified risk factor

Is the problem list used in a continuing fashion?

Example:

—What fraction of active problems are evaluated at health maintenance visits?

cillin use is favored by prior restriction of activity, prior hospitalization, and involvement by the parent in visits.⁹

Less satisfactory compliance was associated with adolescents, females, and large sibships. Interestingly, compliance was not predicted by socioeconomic status or income.

Without patient compliance, other benefits (favorable outcomes) of "continuity" might well be obscured.

Continuity of Information

The critical importance of accurate and available information has been recognized by the emphasis placed upon the problem-oriented medical record (POMR). The POMR is a powerful tool, but its use does not automatically insure continuity of information. Within actual records, whether in practice or in teaching programs, information is missing. The format of the POMR is often broken and prior data may not be used (or cannot be read). There is need to evaluate the data used in medical care and the degree to which continuity of information is achieved. Table 3 suggests three elements of continuity of information that are amenable to measurement and assessment. Each element is based on a practical question and relates to data necessary for clinical assessments made over a period of time.

The first form of continuity of information is based on the question, "Is needed information available?" For example, the immunization status of an individual must be referred to repeatedly. Within a given record, it may be current and in prescribed format; it may exist within the record but be scattered or incomplete, or it may be absent. Evaluation of charts for availability of such data is usually not reassuring.

A second question which can be asked in relation to the continuity of information over time is, "Does information lead to action?" If audit of immunization data revealed a population of patients who were incompletely immunized, is there evidence that efforts were made to contact those individuals and bring their status to a satisfactory level? Another example of assessing this element of continuity would be the examination of responses made to an "abnormal" laboratory test or physical finding. Are results followed up? The

common occurrence of "abnormal" results from multichannel auto-analysis makes this an increasingly difficult problem of information management.

A third element of continuity of information is provided by the problem list itself. To what degree does the clinical record document utilization of the active problem list over time as a tool in providing continuity of patient care? Health maintenance visits are designed to provide the opportunity to update management of all active problems as well as to define new ones. It is appropriate to explicitly document the current status of all problems at health maintenance visits. In auditing continuity, one can count the instances of such documentation as a means of calculating an index which serves in yet another way to measure or quantitate continuity of information.

Auditing of data within clinical charts is a tedious and time-consuming procedure and an important part of a teaching program. The results of such audits can be given additional significance by assessing the continuity of information and the relationship of such continuity to outcomes of care. Teaching programs where such auditing can be done have a special opportunity and obligation to contribute to better understanding of these relationships within the broad "theory" of continuity of care.

Continuity of the Patient-Professional Relationship

The patient is the reference point for continuity of care. A unit of measurement for continuity of relationship must be defined in terms of encounters between the patient and health workers. To "measure" continuity, encounters must not only be counted, but described in terms of who participates and what kinds of problems are addressed. We do not yet have agreed-upon methods to quantitate continuity of responsibility or relationship. However, in defining intensity and quality of continuity of care, we must ask questions such as the following:

1. Who bears the principal or primary relationship?
2. Are there associates who share responsibility and help provide continuity?

3. What is the relative contribution to continuity of encounters with the principal professional as compared with her partners or associated allied health workers?

4. Which visits are most important in maintaining continuity? What is the relative "weight" of health maintenance, chronic follow-up, acute illness or injury, etc?

Little work has been done to quantitate the concept of continuity of patient-professional relationship. Table 4 summarizes some measures of "continuity" that can be used.

Perrin and co-workers have used such methods to evaluate the role of continuity in a program for handicapped children.¹⁰ Mindlin and Densen defined continuity for urban infants in middle and lower-class neighborhoods as "present" during the first year only if the infant had a single source of care, or, if she had multiple sources, obtained care only by referral from the earlier source.¹¹ By these criteria, slightly over 50 percent of white middle-class infants had "continuity," while only 25 percent of minority middle-class, and ten percent of minority lower-class did.

Spinuzzi and co-workers evaluated continuity of the patient-professional relationship for a cohort of children followed in a teaching clinic during the first year of life (Spinuzzi R, Hansen M, Fischer A: unpublished studies). In the clinic there was a clear team organization involving nurses who were present throughout the study and house officers who changed each two months. Of all encounters for health supervision, 74 percent of contacts were with the patient's specific nurse

who was first seen in the newborn period. An additional 4.5 percent were with the second nurse on the same team. Thus only about one in five health supervision visits were with a nurse with whom the patient had no established relationship. The average patient saw an average of 2.2 nurses during the course of the first year's health supervision (overall there was 90 percent compliance with the planned schedule of health supervision.)

On the other hand, the physician's role was very discontinuous. Only 29.5 percent of health supervision involved a physician who saw the patient more than once. Patients saw on the average 4.3 house staff doctors (in an average series of 5.5 health supervision visits, in the first 13 months!)

In contrast, for contacts other than for planned health supervision, the patient's primary nurse was involved in only 38 percent of contacts (increasing to 59 percent if contacts involving only a nurse are examined — these latter are mainly phone calls). For the non health assessment contacts, only 41 percent involved physicians who saw the patient more than once.

In preliminary studies we have used subjective estimation to assign a

measure of importance to continuity for different kinds of visits. Table 5 presents estimates made by family practice residents of ten different encounter types. It is obvious from the large standard deviations that the amount of disagreement between physicians is large relative to differences of means. These rankings should therefore only be considered as exploratory and used as examples of a method. There is, however, considerable "sense" in the ranking and reason to be hopeful that such methods can be used to give more rigorous and quantitative meaning to the concept of continuity of relationship. Similar methods have been used to weigh the contribution of "continuity" of a visit by the principal physician, his partner, or allied health workers having a relationship with the patient.

Relationship of "Continuity" to Health Care Outcomes

To date there have been few systematic and rigorous attempts to relate "continuity" to health status outcomes. In almost all such studies one cannot separate the effects of "continuity" from "comprehensiveness," and they are usually studied together.

Fraction of visits by "principal" MD
Fraction of visits involving members of a team (MS, RN, SW, etc)
Fraction of visits by "partners"
Fraction of visits seeing same doctor as preceding visit
Professionals encountered/patient

Rank	Kind of Encounter	Relative Value*
1	A delivery	4.1 ± 0.9
2	Follow-up of a chronic condition	4.0 ± 1.2
3	Decision to hospitalize a patient	3.9 ± 0.9
4	A home visit	3.8 ± 0.8
5	Acute illness which is diagnostic problem	3.7 ± 1.1
6	Health maintenance visit	3.4 ± 1.1
7	Follow-up for acute illness	3.4 ± 1.0
8	Telephone call — acute symptom	3.1 ± 0.9
9	An injury requiring suturing	2.9 ± 1.3
10	Acute illness with obvious diagnosis	2.4 ± 1.2

* 5 = very important
1 = not important at all

Comprehensiveness is generally defined in terms of service offered (eg, MD, RN, Social work, nutrition), rather than problems identified and addressed — let alone problems solved. In many ways, however, the most palpable variable is continuity, and generally study groups are contrasted with control groups who continue to receive traditional (usually urban, non-family practice) care, which is considered to be discontinuous.

Of particular interest are the studies of Gordis and co-workers. In one study the outcomes for continuous vs traditional care in two situations were examined.¹² The first involved health supervision in infants. No advantages could be demonstrated for the continuous/comprehensiveness group. The second situation involved care provided to two randomly selected groups of patients being followed for post-rheumatic fever management by a hospital clinic. The group assigned to a continuing care team (which provided all other pediatric care as well as rheumatic fever follow-up), showed no improvement in compliance with prophylaxis. Since the authors considered compliance with prophylaxis to be the main means to decrease morbidity, the study was certainly disappointing to advocates of continuing comprehensive care.

A subsequent study by Gordis examined the actual incidence of rheumatic fever (the outcome) in Baltimore census tracts, served or not served by defined comprehensive care programs.¹³ In tracts served by comprehensive programs, the incidence of hospitalization for first attacks of rheumatic fever between 1968 and 1970 was 10.6 per 100,000 children. This represented a 60 percent decrease compared with 1960 to 1964. In adjacent tracts (with similar populations) not eligible for the comprehensive care programs, the rate was 15.3 per 100,000 representing a decrease of only 15 percent. This result cannot be attributed to continuity of care, per se, but "continuity" is a major goal of such programs and offers hope that its importance can be documented.

One of the most ambitious projects designed to evaluate the outcomes of continuity and comprehensive care was carried out by Alpert, Haggerty, and co-workers at the family health care program at Harvard.^{14,15} The

study involved selecting 750 suitable families who used the Emergency Room and had no identified physician. These families were then assigned randomly to three groups — one of which received continuing care from the project while the others (differing only in how they were interviewed in follow-up) received care in whatever way they had in the past. One result of particular interest was the determination of use of diagnostic studies, x-rays, and antibiotics in the continuing care and control groups.¹⁵ The experimental group showed strikingly fewer studies and treatments received in situations where the diagnosis was ambiguous. It was quite plausible to relate the variance in the patterns to the fact that the physicians who knew the patients well were on more secure clinical grounds or could trust their follow-up with the patient, and thus needed to utilize fewer studies. The net result was that patients receiving continuing care had lower costs associated with lab and medication charges for groupings of similar diagnosis.

A recent study by Becker and co-workers has attempted to further isolate the dimension of continuity.¹⁶ This study is interesting in that it has concentrated on the outcome of satisfaction, and included physician/professional staff satisfaction as well as patient satisfaction. Measures of satisfaction were found to be consistently greater for patient, physician, and clinic staff in the continuing care group.

Attention directed to satisfaction may really go to the heart of the questions relating to continuity of patient-professional relationships. There are many ways in which "continuity" may facilitate improved clinical data, the delivery of specific services, patient compliance and perhaps even health status outcome. Even if none of these relationships proves to be verifiable, however, the issue of continuity will remain an important one and properly so.

The development of a patient-professional relationship requires work on the part of both parties. Both patient and professional need to have a comfortable basis for problem exploration and formation of a treatment plan. There are many situations in which appropriate treatment can be accomplished with no continuity of

relationship between patient and professional. But for many problems the patient and the professional may need to know each other well. It may well be that continuity of the patient-professional relationship is most important from this perspective.

Conclusion

Continuity of care remains a major goal within family practice. The costs and benefits associated with continuity are incompletely defined. There are methods, however, which can be utilized to explore these issues and to increase our understanding of the processes and outcomes of health care, and of the patient-professional relationship. Use of such methods should help to strengthen the discipline of family medicine and to clarify the assumptions upon which so much of our practice rests.

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