

### **Theoretical Foundations**

## **Needs Assessment in the New Health Care Environment: Combining Discrepancy Analysis and Outcomes to Create More Effective CME**

DONALD E. MOORE, Jr., PhD  
Manager, Continuing Medical Education  
Queens Medical Center, Honolulu  
Honolulu, Hawaii

**Abstract:** *The difference between what continuing medical education (CME) research suggests results in successful CME and how CME is actually planned has major implications for individuals who plan and conduct CME. There are several strategies based on what this research says that individuals responsible for CME could follow to develop successful CME activities. An obvious first step is to determine what successful CME is. A second strategy is to use a discrepancy model to frame the definition of success into “what is” and “what should be.” A third strategy is to select sources of data and techniques to collect data that sufficiently describe both ends of the gap to facilitate the description and analysis needed for educational planning. This article describes these three strategies.*

**Key Words:** Continuing medical education (CME), discrepancy analysis, effective CME outcomes, needs assessment

Most physicians and others involved in health care regard continuing medical education (CME) as an important way for physicians to update the knowledge and skills necessary for providing the best possible health care to their patients. At the same time, concerns emerged several years ago that CME as it has been traditionally offered does not work.<sup>1</sup> Two important studies provide reassurance that CME does work but at the same time demonstrate that there are important planning considerations that are associated with CME activities that work. According to these studies, well-done needs assessment is an essential part of effective CME planning.

In the first study, Fox et al.<sup>2</sup> interviewed 340 physicians about the learning activities they used

in professional and personal change events and determined that the most successful change efforts focused educational activities on the behavior to be changed. Typically, physicians in the study changed a behavior by realizing that there was some difference between how they were performing that behavior and how they should have been performing that behavior. In educational circles, the identification and description of this difference between current performance and some desired performance, the discrepancy between “what is” and “what should be,” is the definition of educational need.<sup>3–5</sup>

In the second study, Davis et al.<sup>6</sup> reviewed 99 randomized controlled trials in which CME was positively associated with physician behavior change. They determined that successful CME results from planning that includes a focused needs assessment and multiple educational activities focused on the educational need identified by needs assessment.

The vision of successful CME that emerges from these two studies is not necessarily the

---

The author was Director, Continuing Medical Education, School of Medicine, University of North Carolina at Chapel Hill, during the initial writing of this article.

Reprint requests: Donald E. Moore, Jr., PhD, Medical Services Division, Queens Medical Center, 1301 Punchbowl Street, Honolulu, HI 96813.

traditional lecture that may or may not address the practice circumstances and educational needs of the audience. Rather, it is a focused stream of educational activities, both formal and informal, the content of which is based on an understanding of what knowledge, skills, and attitudes the learners need to improve their performance so that patients receive the very best possible care. For the most part, CME is not currently offered in this way. Most CME is episodic, based on data describing “topics” that potential learners identify in hastily completed surveys or postcourse evaluation forms. In the best of all possible current worlds, these data are reviewed by a course director and CME planners to determine what “topics” should be covered in the annual course.<sup>7,8</sup> It is then left up to the speakers, with little or no conversation or direction, to identify the knowledge, skills, and attitudes that potential learners “need.”

This difference between what CME research suggests results in successful CME and how CME is actually planned has major implications for individuals who plan and conduct CME. There is evidence that describes what elements are necessary to plan successful CME. If CME planners and organizers continue to use approaches to planning CME that do not result in successful CME, the CME enterprise is at risk in the emerging health care system.

There are several strategies that individuals responsible for CME could follow to develop successful CME activities. An obvious first step is to develop local consensus about what successful CME is. A second strategy would be to use a discrepancy model to frame the definition of success into “what is” and “what should be.” A third strategy is to select sources of data and techniques to collect data that sufficiently describe both ends of the gap to facilitate analysis and educational planning. A short description of each strategy follows.

### **Defining Successful CME**

Evaluation schemes developed by Dixon<sup>9</sup> and Walsh<sup>10</sup> provide useful criteria by which to judge

the success of CME.<sup>11</sup> These criteria include participation, perception of effectiveness, learning, performance, and patient health status. It is useful to think of these criteria as sequential, with each criterion building on the criterion that preceded it:

1. *Participation.* One of the criteria for a successful CME activity may be the number of learners who attended a traditional course or enrolled in a self-study activity.
2. *Perception of effectiveness.* The next level criterion is the satisfaction of those who attended. This may be done by focusing on registration services, the quality of the educational experience, or the performance of speakers.
3. *Learning.* Another criterion for successful CME is the degree of learning that occurred as a result of participation in CME. This could be assessed by measuring changes in the knowledge, skills, or attitudes of the participants.
4. *Performance.* A further criterion would be the amount of improved performance attributable to participation in CME.
5. *Outcomes.* A final criterion is patient, societal, or economic outcomes.

It is always useful for individuals responsible for planning and organizing CME activities to discuss the criteria for the success of a CME activity with CME course directors during initial planning meetings and specify the criterion that will govern planning decisions. A different approach to CME programming is associated with each criterion.

If the criterion for success is participation, programming is offered in a traditional format without much recognition or response to the characteristics of the physician learners or their educational needs. Typically, programming is planned on the basis of “expert opinion,” “consensus of

experts,” or “advances in the field,” usually described in the literature. This type of CME usually takes the format of the “expert” providing information to attendees in a lecture format. The major concern is attendance.

If the criterion for success is the satisfaction of the participants, programming begins to reflect the interests of the potential participants but retains the traditional format of episodic lecture presentations. The interests of potential participants are typically ascertained by asking them to identify topics “that they would like to hear about,” usually in response to a “needs” assessment survey or a question on an evaluation form. The major concern of organizers is “did they like the course?”

If the criterion for success is learning, programming begins to reflect the educational needs of the potential participants through a careful process of needs assessment. More objective data are collected about the educational needs of potential participants, usually summarized as a gap between some current level of knowledge, skills, or attitudes and some higher, more desired level of knowledge, skills, and attitudes. The major concern of the organizers is “what did they learn at the course?” A typical way of answering that question is provided by comparing the results of a post-test with the results of a pretest, comparing the before and after test scores of the participants.

If the criterion for success is improved performance, planning usually focuses on careful observation of current performance and comparing the observed performance with some “gold standard” of performance. The major concerns of organizers center on the question “did any behavior change in the direction of *improved* performance?” Measuring performance before and after an educational intervention is a typical method of answering this question. Initial efforts to detect performance improvements in this way were disappointing. After some considerable investigation, however, it became clearer that single-episode educational interventions would not produce a sustainable improvement in before and after mea-

surements of performance. Rather, carefully structured multiple interventions focused on a specific behavior to change usually resulted in positive differences in before and after measurements.<sup>6,12</sup>

If the criterion for success is improved outcomes, planners can choose from three types of outcomes. Patient health status is one type and is determined by measuring variables related to specific conditions and general health as well as to patient satisfaction and performance. Another outcome is economic, which is determined by measuring financial variables related to health care. The third outcome is societal, which is determined by measuring sociological variables related to health care.<sup>13</sup> Impact on these outcomes could be determined by measuring variables related to the outcome under scrutiny before and after the educational intervention.

### **Discrepancy-Based Needs Assessment Model for Planning CME**

The notion of educational need as a discrepancy or a gap has gained increasing popularity in educational circles. The concept of educational need was first introduced by Dewey as a way of moving from “teacher-centered education” to “student-centered education.”<sup>14</sup> London<sup>15</sup> first introduced the concept of educational need into the adult education literature and Knox<sup>3</sup> was the first to apply the concept of discrepancy analysis to general continuing education. Fox<sup>4</sup> proposed the use of a discrepancy model as a way of planning CME. Moore and Cordes<sup>5</sup> have developed an administrative model for conducting needs assessment in CME settings.

The discrepancy model proposed by Fox<sup>4</sup> provides a framework for addressing the planning issues confronted by CME in the areas of physician competence, physician performance, and patient health status. A logical extension to Fox’s model seems to be to include the first two criteria of successful CME discussed earlier. Using this model, an educational need in CME would be the discrepancy between “what is” and “what should

## Needs Assessment in Effective CME

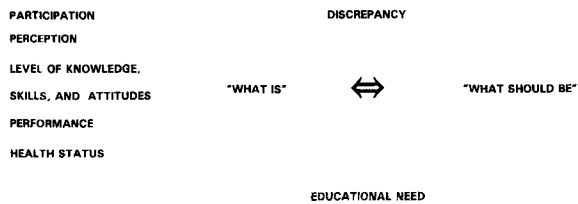


Figure 1 Applying the discrepancy model to the criteria for successful CME.

Combining the notion of discrepancy analysis and the five levels of criteria for effective CME appears to provide a more powerful framework for assessing education needs in CME settings than has existed previously. In this model, the CME planner contrasts “what is” and “what should be” and makes judgments about the “discrepancy” or “gap” that results that form the foundation of planning decisions. In order to make those judgments, the CME planner must first measure the discrepancy and then analyze it.

be” in each of the five criteria, summarized in Figure 1. Some examples are provided below:

- If the criterion for success is *participation*, the “what is” could be attendance at last year’s course, and the “what should be” could be the desired attendance for this year’s course.
- If the criterion for success is *satisfaction*, the “what is” could be evaluation results from last year’s course, and the “what should be” could be a target rating for this year’s course.
- If the criterion for success is *learning*, the “what is” could be the level of knowledge, skills, and attitudes before the CME activity, and the “what should be” could be an increased level of knowledge, skills, and attitudes.
- If the criterion for success is *performance*, the “what is” could be the performance level before the CME activity or series of CME activities, and the “what should be” could be some standards of achievable best practice.
- If the criterion for success is *patient health status*, the “what is” could be patient health status measured before the CME activity or series of CME activities, and the “what should be” could be some achievable level of health status, perhaps as outlined in planning documents like Healthy People 2000.<sup>32</sup>

### Measuring the Discrepancy

There are two major tasks that must be accomplished to measure the discrepancy. First, the CME planner, along with the course director and other important stakeholders, must determine what constitutes success for the CME activity or series of CME activities that are being planned. Second, the CME planner should then devise a data collection strategy appropriate to that level of success.

Devising a data collection strategy consists of determining the types of data required, identifying sources for the data, and then selecting data collection techniques. Data should be collected for both sides of the “gap,” that is, data should be collected about “what is” as well as about “what should be.” It may be that the strategy for collecting data describing “what is” will be different from the strategy for collecting data describing “what should be.”

**Participation.** If *participation* is the criterion for success, the data to be collected would be the number of participants. Data collection for “what is” could consist of obtaining attendance totals for a previous offering of the CME activity. Data collection for “what should be” could be to ascertain the attendance figures “desired.”

**Perception.** If the criterion for success is *positive perceptions* of the CME activity, the data to

be collected would be the perceptions of those involved, both learners and teachers. Learner data might include learner perceptions about the quality of the CME experience such as location, scheduling, meeting rooms, and food and beverage service. Teacher criterion might include perceptions of the competence and performance of the participants.

Typically, collection of “what is” data about perceptions of the quality of the CME experience consists of using evaluation forms distributed after CME activities to ascertain the opinions of participants about location, scheduling, meeting rooms, and food. Data about “what should be” are usually collected in the same manner, usually in the general comments section of the evaluation form, or in individual comments by participants to CME staff or organizers.

Data about perceptions of the competence and performance of the participants can be obtained from both the participants and “faculty experts.” Typically, “what is” data are obtained by asking participants for their opinions either on postcourse evaluations or questionnaires mailed to them before a CME activity. Occasionally, faculty experts are asked to comment on “what is” but they are more likely to be asked to state “what should be” based on data about the current performance of potential participants. Mazmanian<sup>16</sup> described this process as iterative where data from postcourse evaluations, precourse questionnaires, and faculty expert opinion interacted in a planning committee setting to define, refine, and justify an emerging idea for a CME activity. While most questionnaires are sent to potential registrants, Ward and Boyle<sup>17</sup> have reported success sending questionnaires to registrants of a CME activity as a way of focusing course content more on their educational needs. Sudman and Bradburn<sup>18</sup> and Dillman<sup>19</sup> have produced guides for developing and using questionnaires that would be helpful to CME planners both for postcourse evaluations and precourse surveys. Curry and Purkis<sup>20</sup> suggest that the use of self-reported data is a valid way to obtain information about physician performance.

Interviews<sup>21</sup> and focus groups<sup>22</sup> are useful in circumstances where detailed information is sought.

**Learning.** If *learning* is the criterion for success, the data to be collected are the knowledge, skills, and/or attitudes of the participants. Data for “what is” could be collected using a pre-CME activity test or examination. Typically, multiple-choice questions are used for assessing levels of knowledge; observation checklists or rating scales are used to ascertain the level of psychomotor skill; and Likert-type scales are used to determine attitudes. Each of these approaches have significant design requirements that affect the reliability and validity of results and testing experts may be required.

The data for “what should be” generally inform the development of the test. Again, CME planners should use content experts in developing items for tests who can draw on their opinion and experience as well as research reports. Professional societies in medicine typically use self-assessment examinations in their continuing education activities. Many CME sponsors are beginning to use the power of electronic technology to assess not only facts but clinical reasoning in dynamic patient-case-based situations.<sup>23</sup>

**Performance.** If the *performance* of participants is the criterion for success, the data to be collected are the behavior of the participants. Two types of performance data could be collected: simulated and actual.

Data about simulated performance would be collected during a CME activity and would require participants to be involved in activities like case studies or role plays in which they would be required to perform the target behaviors. Data about “what is” could be collected by using observation checklists or rating scales. As in testing, the data for “what should be” generally inform the development of the simulation.

The emerging new health care environment has provided the setting in which techniques associated with quality management can provide data about

actual performance. Quality improvement teams, active in many hospitals, are providing information about “what is.” Data about “what should be” are provided by practice guidelines adapted to local conditions, expert opinion, and research reports.<sup>24,25</sup> New strategies like disease management provide an opportunity for needs assessment to focus on specific disease-related performance issues.<sup>26</sup>

**Outcomes.** If *outcomes* are the criterion for success, the assessment could focus on one or all three types of outcomes. For example, if the concern is the health status of the patients cared for by the participants in a CME activity, there are several types of data that could be collected. First, data about the general health of patients could be collected using the SF-36 (“short form” with 36 questions).<sup>27,28</sup> Alternatively, one could collect data describing the specifics of the disease condition such as fasting blood sugars or diastolic blood pressures.<sup>29</sup> In addition, TyPEs (Technology of Patient Experience) could be used to collect data about specific conditions.<sup>30–32</sup>

If the concern is economic issues related to the provision of health care, data about finances could be collected primarily from large administrative databases maintained by health systems. This might include variables like length of stay, readmission rates, or treatment costs.

Finally, if the concern is the societal circumstances of the patients cared for by the participants in a CME activity, sociological data could be collected. For example, in one report describing a CME activity dealing with workers’ compensation, an important outcome of the CME activity was an increase in the number of jobs in the community.<sup>31</sup>

For each type of outcome, data about “what is” should be collected before the CME activity. Data about “what should be” could be collected from a variety of sources, including reports such as Healthy People 2000.<sup>32</sup>

## Analyzing the Discrepancy

Methods for analyzing data can range from the statistics-based methods (quantitative analysis) used by educational psychologists and social scientists to more ethnographic methods (qualitative methods) typically used by historians and anthropologists. In addition, both statistical and ethnographic methods can also vary in level of sophistication and complexity. Attention needs to be paid to ensuring that textbooks, statisticians, and research design consultants are used when required.

### Quantitative Approach

Typically, the data describing “what should be” are not variable. They are the standard against which the data describing “what is” will be judged. The method for analyzing the discrepancy between “what is” and “what should be” that should be chosen is the method that helps the planners of the CME activity best visualize “what is” as a first step in comparing it with “what should be.”

If the criterion for success is the number of *participants*, determining the discrepancy is a relatively straightforward calculation and planning and promotional strategies would probably be modified to accomplish the desired increase in participants.

If the criterion for success is the *perception* of the participants, determining the discrepancy and its significance are slightly more involved. For example, if one was planning a course on the diabetic foot and wanted to know whether physicians met the American Diabetes Association standard of inspecting the feet of their diabetic patients during each office visit, one could use a scale of 1 to 3 (never to always). If the mean response provided by the physicians was 2.2, one could “eyeball” the difference between 2.2 and 3.0 (the standard) and say that the difference is a “significant” enough difference to warrant an educational activity. Or one could use a single sample t-test, which compares an estimated population mean (the mean for the question) with a constant (the standard). The

t-test will tell you whether there is a statistically significant difference.

If the criterion for success is improved *performance*, data about physician performance could be collected from abstracting charts and compared to a standard using statistical techniques. If the criteria for success is improved *outcomes*, results of the administration of the SF-36<sup>27,28</sup> and TyPEs<sup>30-32</sup> could be compared to some standard using statistical techniques.

### Qualitative Analysis

Qualitative analysis is another approach that can be used to examine data to determine if educational needs are present. Qualitative techniques are becoming increasingly popular because some feel that orthodox quantitative approaches to data collection and analysis have produced “objective” data that do not necessarily provide an understandable picture of the complex situation being studied. Qualitative approaches use naturalistic techniques that are based more on approaches common in anthropology and the social sciences and usually focus on words rather than numbers. Naturalistic inquiry can include techniques like observation and interviewing, which are also used in quantitative data collection, but with a different focus. In qualitative studies, the individual collecting the data does not impose his or her ideas on the data. Rather, the understanding of the phenomena being studied emerges from the data.<sup>33,34</sup>

If one was to consider the example describing the quantitative assessment of the physicians managing the diabetic foot, proponents of the qualitative approach might suggest that an open-ended interview or in-situ observation of physician behavior would provide a richer understanding of the phenomenon.

In qualitative analysis, typically there is no precise point at which data collection ends and analysis begins. Before data collection begins, the categories of events that will be observed are identified and defined based on the question(s) to be answered. In CME planning, the question may

very well be “What are the CME needs of physicians in the area of management of patients with diabetes?” A variety of categories may emerge as a result of stating these questions based on what is known about the care of diabetes patients. Looking at the feet of patients with diabetes at every office visit is one such category. These categories describe the issues that will be examined but do not limit the observations by setting conditions. If an interview approach is used to collect and analyze data about diabetes management, questions would not be asked to test a hypothesis. Rather, questions would be asked to collect data about how physicians and other providers manage patients with diabetes, and in particular how and when they are able to look at their patients’ feet. In the course of gathering data, ideas about the analysis will occur and in many cases will alter the categories and in other ways shape future data collection. For example, it may become clear that many physicians delegate the responsibility of looking at patients’ feet to their physician assistant and data collection and categories may be adjusted accordingly.

Findings can be reported in several forms. Some data reporting, like narrative descriptions of the phenomena and case studies, encourages the recipient of the report to continue analyzing the data. Inductive analysis and logical analysis present the analysis of those conducting the study but describe clearly how the analysis evolved. If a CME planner chose to use a qualitative approach, it is most likely that the size and nature of the discrepancy would be negotiated with the learners or their representatives.

Obviously, a qualitative approach is not appropriate for either collecting or analyzing information about registration. But if the criterion for success is the positive perceptions of the participants, data could be collected from participants in unstructured interviews. These interviews would be unstructured to elicit data about the CME activity important to the participants. Participants could be interviewed at two levels: first, logistical and administrative arrangements; second, the learning

experience as it contributed to improved competence and performance. Speakers and faculty planners could be interviewed in the same way.

The strategies used to identify and examine the discrepancy between “what is” and “what should be” could be used in situations when the criteria for success would be increase in knowledge, skills, and attitudes; physician performance; or outcomes of health care. For example, if the criterion for success is increase in knowledge, an oral examination could be developed that examined the knowledge levels of physicians with respect to the issue or issues at hand, in this case, observing the feet of diabetic patients. If the criterion for success is improved performance, data about physician performance might still be collected from abstracting charts but interaction between the physicians and course speakers or planners could produce an improved understanding of the educational needs of the physician group being studied. The stimulated recall technique developed by Parboosingh et al. is an example of this approach.<sup>35</sup> If the criterion for success is improved outcomes, patients could be interviewed using unstructured interviews using the substance of the SF-36<sup>27,28</sup> and TyPEs<sup>30–32</sup> to obtain a richer picture of their health status.

### **Summary and Conclusion**

This article describes combining a discrepancy approach to needs assessment with an outcomes focus. In addition, it focuses on techniques to collect data about both ends of the discrepancy and analyze the nature and scope of the discrepancy. Individuals who plan CME activities are encouraged to experiment with the strategies described as a way of developing CME activities that will have more value in the new health care environment.

### **Acknowledgment**

The author would like to thank Hank Slotnick, PhD, and Peter Margolis, MD, PhD, for their helpful comments about the statistical analysis of needs.

### **References**

1. Sibley JC. A randomized trial of continuing medical education. *N Engl J Med* 1982; 306:511–515.
2. Fox RD, Mazmanian PE, Putnam RW. *Changing and learning in the lives of physicians*. New York: Praeger, 1989.
3. Knox AB. Critical appraisal of the needs of adults for educational experiences as a basis for program development. Department of Adult Education, University of Nebraska, Lincoln, NE, 1963. (ERIC Document 022 090, 1969).
4. Fox RD. Discrepancy analysis in continuing medical education. *Möbius* 1983; 3:37–44.
5. Moore DE Jr, Cordes DL. Needs assessment. In: Rosof AB, Felch WC, eds. *Continuing medical education: a primer*. New York: Praeger, 1992:42–51.
6. Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance: a systematic review of continuing medical education strategies. *JAMA* 1995; 274:700–705.
7. Mazmanian PE. A decision-making approach to needs assessment and objective-setting in continuing medical education. *Adult Educ* 1980; 31:3–17.
8. Mazmanian PE, Mazmanian PM. The use of interviews and survey questionnaires in determining physician-learner need. *Möbius* 1981; 1:11–20.
9. Dixon J. Evaluation criteria in studies of continuing education in the health professions. *Eval Health Prof* 1978; 1:47–65.
10. Walsh PL. Evaluating educational activities. In: Adelson R, Watkins FS, Caplan RM, eds. *Continuing education for the health professions: educational and administrative measures*. Rockville, MD: Aspen, 1985:71–100.
11. Davis DA, Taylor-Vaisey A. Two decades of Dixon: the question(s) of evaluating continuing education in the health professions. *J Cont Educ Health Prof* 1997; 17:207–213.
12. Davis DA, Thomson MA, Oxman AD, Haynes RB. Evidence for the effectiveness of CME: a review of 50 randomized controlled trials. *JAMA* 1992; 268:1111–1117.



13. Williamson JW, Moore DE Jr, Sanazaro PJ. Moving from "small qa" to "LARGE QA": an outcomes framework for improving quality management. *Eval Health Prof* 1991; 2:138–160.
14. Atwood HM, Ellis J. The concept of educational need: an analysis for adult education. *Adult Educ* 1971; 19:210–214.
15. London J. Program development in adult education. In: Knowles MS, ed. *The handbook of adult education in the United States*. Chicago: Adult Education Association of the United States, 1960:65–81.
16. Mazmanian PE. A decision-making approach to needs assessment and objective-setting in continuing medical education. *Adult Educ* 1980; 31:3–17.
17. Ward J, Boyle C. Evaluation of skin cancer seminar for general practitioners: changes in knowledge, diagnostic and procedural skills, beliefs, and self-reported practices. *J Cont Educ Health Prof* 1995; 15:217–226.
18. Sudman S, Bradburn NM. *Asking questions; a practical guide to questionnaire design*. San Francisco: Jossey-Bass, 1989.
19. Dillman DA. *Mail and telephone surveys: the total design method*. New York: Wiley-Interscience, 1978.
20. Curry L, Purkis IA. Validity of self-reports of behavior changes by participants after a CME course. *J Med Educ* 1986; 61:579–584.
21. Antaki C. *Analyzing everyday explanations: a case book of methods*. Newbury Park, CA: Sage, 1988.
22. Krueger RA. *Focus groups: a practical guide for applied research*. Newbury Park, CA: Sage, 1998.
23. Jacobs LC, Chase CI. *Developing and using tests effectively: a guide for faculty*. San Francisco: Jossey-Bass, 1992.
24. Leininger L, Harris R, Jackson RS, Strecher VJ, Kaluzny AD. CQI in primary care. In: McLaughlin CP, Kaluzny AD, eds. *Gaithersburg, MD: Aspen*, 1994:253–264.
25. Solberg LI, Kottke TE, Brekke MI, Calomeni CA, Conn SA, Davidson G. Using continuous quality improvement to increase preventive services in clinical practice—going beyond guidelines. *Prev Med* 1996; 25:259–267.
26. Todd WE, Nash D. *Disease management: a systems approach to improving patient outcomes*. Chicago: American Hospital Association, 1997.
27. Stewart AL, Ware JE. *Measuring functioning and well-being: the medical outcomes study approach*. Durham, NC: Duke University Press, 1992.
28. Stewart AL, Hays RD, Ware JE. The MOS short form general health survey: reliability and validity in a patient population. *Med Care* 1988; 26:724–735.
29. Benson DS. *Measuring outcomes in ambulatory care*. Chicago: American Hospital Association, 1992.
30. Ellwood PM. Outcomes management: a technology of patient experience. *N Engl J Med* 1988; 318:1549–1556.
31. Pyatt RS, Caldwell SC, Moore DE Jr. Improving outcomes through an innovative continuing medical education partnership. *J Cont Educ Health Prof* 1997; 17:239–244.
32. U.S. Department of Human Health and Services. *Healthy people 2000*. Washington, DC: U.S. Government Printing Office, 1991.
33. Patton MQ. *Qualitative evaluation methods*. Beverly Hills, CA: Sage, 1980.
34. Miles MB, Huberman AM. *Qualitative data analysis: a sourcebook of new methods*. Beverly Hills, CA: Sage, 1984.
35. Parboosingh J, Avar D, Lockyer J, Watson M, Pim C, Yee J. The use of clinical recall interviews as a method of determining needs in continuing medical education. *Proc Annu Conf Res Med Educ* 1987; 26:103–108.